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BREAST NEOPLASMS

1. EFFECT OF RADIOTHERAPY IN THE TREATMENT OF PRIMARY BREAST CANCER ON SECOND BREAST CANCER RISK (MEETING ABSTRACT).

Hankey BF, Curtis RE, Naughton MD
National Cancer Institute, Bethesda, MD, 20205
4th Annual San Antonio Breast Cancer Symposium, Nov 6-7, 1981, San Antonio, Texas Cancer Therapy and Research Center of South Texas; 1981

Radiation therapy for primary breast cancer has been the subject of some debate regarding its potential effect on the risk of second cancers and, in particular, second breast cancers. The data on 23,129 primary breast cancer patients (excluding those with distant metastases) diagnosed during 1935-73 in the State of Connecticut were analyzed. The patients could be classified on the basis of whether or not they had ipsilateral axillary lymph node metastases, and whether or not they received adjunctive radiotherapy in addition to surgery as part of their primary therapy. Second breast tumor risk was found to be negatively associated with age and positively associated with stage. Also there was an interaction between age and time from diagnosis on second breast tumor risk. Using appropriate

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multivariate procedures the relative risk of second breast tumors (surgery and radiation group to surgery only group) was estimated to be 1.23 (95% confidence limits; 1.04, 1.46) and did not appear to increase over time from diagnosis. Incomplete adjustment for stage may have accounted for part of the excess risk in the surgery and radiation group. Data for other second cancers including lung, leukemia, and thyroid are currently being reviewed for possible associations with the use of adjunctive radiation therapy. (no Refs)

2. ELECTRON BEAM THERAPY FOR LOCAL RECURRENT BREAST CANCER - THE RELATIONSHIP BETWEEN PROGNOSIS, HISTOPATHOLOGY, AND CLINICAL MANIFESTATION OF RECURRENCE.

Ito I, Miyaishi K, Okazaki A, Maehara Y, Sugiyama S, Nibe H, Nagai T

Dept. Radiology, Gunma Univ. Sch. Medicine, Maebashi-shi, Gunma Prefecture 371, Japan

Nippon Gan Chiryo Gakkai Shi; 16(1):15-20 1981

Effects of electron beam therapy for local breast cancer were evaluated in 74 patients. Of these 74 patients, distant metastases were observed in 5/18 patients with papillotubular cancer, 7/18 with medullary tubular cancer, 17/41 with scirrhous cancer, 1/1 with squamous cell cancer, and 1/1 with mucous cancer. The patients were given a focal dose of 6 Grays (Gy) 2x/wk (total of 30-36 Gy), delivered by means of a Toshiba model LMR-13 Linac with an electron beam energy of 8 million electron volts. This method resulted in a 91.1% local control; the lesions completely disappeared in 134/147 irradiated sites. The 5-yr actuarial survival rate of the irradiated group was 11%, but the 3-and 5-yr survival rates of the patients who did not have distant metastases were 27% and 18%, respectively. Patients with papillary adenocarcinoma and patients with localized recurrence had the best prognosis. Histological type and type of recurrence were thought to be important prognostic indicators. (31 Refs) (In JPN)

3. LIMITED SURGERY WITH OR WITHOUT RADIOTHERAPY FOR EARLY BREAST CARCINOMA.

Freeman CR, Belliveau NJ, Kim TH, Boivin JF

Dept. Radiation Oncology, Montreal General Hosp., 1650 Cedar Ave., Montreal, Quebec H3G 1A4, Canada

J Can Assoc Radiol; 32(2):123-128 1981

Between January 1971 and December 1978, 117 consecutive patients with unilateral early stage carcinoma of the breast were treated with limited surgery, with or without the addition of postoperative radiotherapy. Local excision alone was found to be inadequate treatment for T1 and T2 carcinoma of the breast. Local recurrence rates were also high in patients with T1 and T2 lesions treated by local excision plus relatively low dose radiotherapy. Local recurrence was, however, infrequent after partial mastectomy, and no local failures were observed after partial mastectomy plus postoperative radiotherapy to a dose of 5,000 rad in 5 wk. Morbidity with such treatment is minimal and cosmetic results are generally excellent. (Author abstract) (17 Refs)

4. MULTIMODAL TREATMENT FOR LOCALLY ADVANCED BREAST CANCER. RESULTS OF CHEMOTHERAPY-RADIOTHERAPY VERSUS CHEMOTHERAPY-SURGERY.

De Lena M, Varini M, Zucali R, Rovini D, Viganotti G, Valagussa P, Veronesi U, Bonadonna G

Istituto Nazionale Tumori, Via Venezian 1, Milan 20133, Italy

Cancer Clin Trials; 4(3):229-236 1981

In a prospective randomized study, the efficacy of two combined modality approaches (chemotherapy plus radiotherapy or chemotherapy plus mastectomy) was tested in a total of 132 women with locally advanced breast cancer. Chemotherapy consisted of adriamycin plus vincristine (AV) administered for three cycles before either local-regional modality and subsequently for seven additional cycles. Although a higher proportion of women achieved complete remission after mastectomy (100%) compared to women given radiotherapy (60%), the total response rate at the end of combined modality was identical (75%). There was no significant difference between the two treatment groups in terms of patterns of treatment failure, median duration of response, and total survival. Treatment was not influenced by menopausal or estrogen receptor status. Two patients of the surgical group showed adriamycin-induced cardiomyopathy after cumulative doses less than 500 mg/m2. The results of the present study failed to indicate that surgery per se improved the overall results, including local control, over radiotherapy in a combined modality setting. (Author abstract) (21 Refs)

5. EFFECT OF LITHIUM CARBONATE ON HEMOPOIESIS DURING THE COURSE OF RADIOTHERAPY: CONTROLLED STUDY (MEETING ABSTRACT).

Valentini V, Cellini N, De Renzis C, De Santis M, Mancini R, D'Onofrio G

Ist. di Radiologia, Univ. Cattol. S. Cuore - Roma, Rome, Italy

Tumori; 67(2,SupplA):80 1981

Prolonged administration of lithium carbonate in patients with manic-depressive psychosis induces, as has been known for a long time, the development of neutrophilic leukocytosis. This effect led the authors to carry out a randomized study on a homogeneous population of female patients with neoplasms of the breast or body of the uterus who underwent complementary radiation therapy. Lithium carbonate was administered to a group of 28 individuals and a group of 31 patients served as the control. Weekly blood studies demonstrated the effectiveness of lithium in attenuating the neutropenia related to radiation treatment. In 2 cases there were signs of toxicity which made it necessary to suspend treatment with lithium carbonate. (no Refs) (In ITA)

CENTRAL NERVOUS SYSTEM NEOPLASMS

6. RADIATION TREATMENT FOR MEDULLOBLASTOMA: A 21-YEAR REVIEW.

Berry MP, Jenkin RD, Keen CW, Nair B, Simpson WJ

(c/o Jenkin), Ontario Cancer Foundation, Toronto-Bayview Clinic, 2075 Bayview Ave., Toronto, Ontario M4N 3M5, Canada

J Neurosurg; 55(1):43-51 1981

One hundred and twenty-two patients with medulloblastoma received postoperative irradiation at the Princess Margaret

Hospital, Toronto, from 1958 to 1978, inclusive. The surgical procedure in these patients was total resection (44 patients), subtotal resection (66 patients), or biopsy alone (12 patients). Twenty-five patients received adjuvant chemotherapy. Overall 5-and 10-yr survival rates were 56% and 43%, respectively. Improved survival rates were associated with an increased degree of resection and with posterior fossa radiation doses of 5,200 rads or more. The posterior fossa was the common site of first relapse (in 56 patients, 46%). Systemic metastases at first relapse occurred in 18 of 52 patients (35%), and were associated with the use of ventriculosystemic shunts. Millipore filters did not prevent systemic relapse in shunted patients. A subset of 15 patients who received a posterior fossa dose of 5,200 rads or more after a total resection had a 5-yr survival rate of 77%, which remained constant to 10 yr. This result is considered to be the upper limit that can be achieved by current treatment methods. (Author abstract) (30.Refs)

7. MULTIDISCIPLINARY TREATMENT OF MEDULLOBLASTOMA IN CHILDHOOD (MEETING ABSTRACT).

Colella R, Loiacono G, Santoro A, Garribba P, Timurian A, Occhiogrosso M, De Tommasi A, Pierangeli E
Cl. Pediatrica Univ. Bari, Bari, Italy
Tumori; 67(2,SupplA):105 1981

Survival of children with medulloblastoma has been gradually improving in recent yr as this neoplasm benefited from the addition of postoperative radiotherapy and chemotherapy. Nevertheless up till now there has been no evidence for the validity of using the combination of surgery-radiotherapy-chemotherapy rather than the traditional surgery-radiotherapy. Hence we felt it was important to evaluate survival in 45 children with medulloblastoma subdivided into 3 groups according to the treatment they received. Group 1: 10 cases in which surgery alone was performed (3 cases) or followed by cobalt therapy to just the tumor site (4000-4500 rads); group 2: 15 cases in which surgery was always followed by extensive cobalt therapy to the entire cerebrospinal axis (4000-4500 rads to the cranium, 3500-4500 to the spinal column); group 3: 20 cases in which chemotherapy was added to the surgery and radiotherapy performed as above. 2 yr survival was 30 per cent in group 1, 40 percent in group 2, and climbed to 62 per cent in group 3. No long-term survivors were found in groups 1 and 2, while in group 3 there are 7 patients who have gone off therapy with total survivals of 20, 20, 32, 33, 67, and 33 mo (of these 1 patient has a recurrence at mo 28, 1 is lost to follow-up 69). Thus it is believed that the multidisciplinary approach to medulloblastoma is capable of improving survival. (no Refs) (In ITA)

8. TREATMENT OF MEDULLOBLASTOMA IN CHILDREN: LONG-TERM RESULTS FOLLOWING SURGERY, RADIOTHERAPY AND CHEMOTHERAPY.

Mazza C, Pasqualin A, Da Pian R, Donati E
Dipartimento di Neurochirurgia, Ospedale Civile di Borgo Trento, I-37100 Verona, Italy
Acta Neurochir (Wien); 57(3/4):163-175 1981

Between 1960 and 1978 47 children with histologically proven medulloblastoma were treated with radiotherapy alone or the combination of radiotherapy and chemotherapy (lomustine or methotrexate in 1 patient) after surgery. There were 37 boys and 14 girls, aged 1-15 yr (mean age 8 yr). Total or subtotal removal was accomplished in 23 cases, partial removal in 16 cases, and biopsy alone in six cases. Thirty-seven patients received a course of radiotherapy to the neuraxis, 17 of whom also received radiation therapy to the cerebral hemispheres. Postoperative mortality was 22% (10 cases). Late mortality occurred in 22 cases (46%) with recurrence of tumor in 19, supratentorial metastases in one, hydrocephalus in one, and radiation necrosis in one. All 19 patients with recurrences eventually died, despite treatment. Fourteen patients suffered from metastases of medulloblastoma: 12 died from associated recurrence of tumor, one died from multiple supratentorial metastases, and one was still alive. Ten patients survived more than 4 yr after surgery. Survival for patients completing radiotherapy was 67% at 1 yr, 43% at 3 yr, and 27% at 5 yr; for those treated by radiation and chemotherapy after surgery, it was 60% at 3 yr. (46 Refs)

9. MULTIDISCIPLINARY TREATMENT OF MEDULLOBLASTOMA: A 5-YEAR EXPERIENCE WITH THE SIOP TRIAL.

Gerosa MA
Istituto di Neurochirurgia, Universita di Padova, 35100 Padova, Italy
Childs Brain; 8(2):107-118 1981

Treatment of 33 children with posterior fossa medulloblastoma were treated with the SIOP (Societe Internationale d'Oncologie Pediatrique) brain tumor regimen consisting of major surgical resection, extensive irradiation (5,000-5,500 R to the tumor, 3,500-4,000 R to the whole brain, and 3,000-3,500 R to the spinal cord), and combined chemotherapy with vincristine (1.0 mg/square meter (m2) for induction and 1.5 mg/m2, iv, weekly for a total of 8 courses over approx 48 wk) and lomustine, (100 mg/m2, po/wk for 8 wk over approx 48 wk). Of the 30 evaluable patients, 28 were still alive, with a mean actuarial survival of approx 28 mo. Of the survivors, the performance status was usually good (71.4% over 80 points). The rate of incidence of spinal lesions from radiotherapy was high: 32.1% of altered sitting-standing index, 25% of kyphoscoliosis. Endocrine deficiency was present in 14.3% of the patients. Mental or visual deficits, or the involvement of a cranial nerve, were not unusual. Cerebellar impairment was frequent. Leukopenia and thrombocytopenia were frequent and sometimes severe. Mild, transient liver toxicity occurred in nine cases, and four patients complained of signs and symptoms of toxic hepatitis. (30 Refs)

10. CEREBRAL SPACE-OCCUPYING CYSTS FOLLOWING RADIATION AND CHEMOTHERAPY OF MALIGNANT GLIOMAS.

Volc D, Jellinger K, Flament H, Bock F, Klumair J
Ludwig Boltzmann Inst. Clinical Neurobiology, Wolkersbergenstrasse 1, A-1130 Vienna, Austria
Acta Neurochir (Wien); 57(3/4):177-193 1981

Of 50 patients with malignant supratentorial gliomas treated by surgery, megavoltage radiation, and multi-agent chemotherapy, eight developed cerebral cysts. Case reports of these patients are presented. Five patients developed signs of intracranial hypertension with or without progressive neurological deficit, while in three cases, no clinical deterioration was noted. Computed tomography or surgery disclosed large cerebral cysts at the site of the original tumor, the walls of which were formed by glio-mesenchymal scar with no or very little tumor recurrence. In only two patients, a large tumor formation was present in association with cavity formation. Clinical signs became manifest 4-12 mo after the first craniotomy, and 3-9 mo after termination of radiotherapy. In three patients clinical deterioration related to cyst formation was rapidly progressive, in two it was slow. In five patients, aspiration or surgical evacuation of the cavity transiently improved clinical

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condition, in three, surgical intervention had no favorable effect. In most of the patients, rapid clinical deterioration was caused by excessive tumor progression, and in two it was accompanied by hemorrhage into the tumor. Autopsy findings are reviewed. One patient was still alive 15 mo after surgery. Treatment of cerebral cysts after tumor therapy should be surgery with evacuation of the cysts. (46 Refs)

11. PINEALOMA (GERMINOMA) TREATED BY DIRECT SURGERY AND POSTOPERATIVE IRRADIATION. A LONG-TERM FOLLOW-UP.

Sano K, Matsutani M
Dept. Neurosurgery, Univ. Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan
Childs Brain; 8(2):81-97 1981

Follow-up results of 60 cases of germinoma treated between 1962 and 1979 with direct surgery and postoperative irradiation are reported. The operative approach is reviewed. There was no operative mortality. The 1-yr survival rate, 3-yr survival rate, 5-yr survival rate, and 10-yr survival rate (10 YSR) were 94.8, 81.4, 74.8, and 69.3%, respectively. The 10 YSR for six germinoma cases under 15 yr of age was 86.9%, while that for those more than 15 yr old was 60.2%. The 10 YSR for suprasellar germinoma cases was 92.3%, while that for pineal germinoma cases was 60.1%. The 10 YSR for patients less than 15 yr old with pineal germinoma was 81.4% and, for those with suprasellar germinoma it was 100%, compared with older patients (48.1% and 75%, respectively). Of the 60 cases of pinealoma, 44 were alive, 40 of whom were followed up with respect to functional status: 65% were well and working or going to school, 12.5% were not working, but were able to care for themselves, and 7.5% were bedridden. Of the suprasellar germinoma cases, 35.3% were well, but were unable to work because of visual disturbance. Of the 16 patients who died, two died from recurrence, three from cerebral spinal fluid dissemination, one from hormonal insufficiency, two from other disease, and eight from unknown causes. Treatment of choice for germinoma cases, except with small or multiple tumors, is direct surgery and postoperative radiotherapy. The histogenesis of pinealoma and the causes of its radiosensitivity are discussed. (32 Refs)

DIGESTIVE NEOPLASMS

12. DIAGNOSIS AND THERAPY OF HEPATOBLASTOMA. SUCCESSFUL TREATMENT OF AN INOPERABLE HEPATOBLASTOMA AND REVIEW OF THE LITERATURE.

Gefeller D, Haase E, Loblich HJ
(c/o Haase), Hannoversche Kinderbeilanstalt, Ellernstrasse 40, D-3000 Hannover 1, W. Germany
Z Kinderchir; 33(1):39-54 1981

In a 2-mo-old infant hepatomegaly was observed. During laparotomy inoperability was determined. Histologic analysis of bioptic material revealed an embryonal hepatoblastoma of the small cell-type. The tumor was in Stage III. The infant received endoxan iv for 2 days after surgery (100 and 50 mg, respectively). During the following 6 wk the infant was treated with Co60 irradiation; the two series comprised a total dose of 900 rads. The tumor had then decreased to 3/5 of its original size. Since maintenance therapy with vincristine was not tolerated by the patient, endoxan was again administered orally (5 mg/kg/day). Second laparotomy was performed 1.5 yr after the first intervention. Histologic analysis of the liver resulted in tumor-free liver tissue and lymph nodes. In the literature, complete cure of inoperable hepatoblastoma was rarely reported. Since curative irradiation doses exceed the radiation tolerance of liver parenchyma, radiotherapy must be combined with chemotherapy. In case of partial liver resection, adjuvant chemo- and radiotherapy should not be initiated during the first 4-8 post-operative wk in order to avoid possible regeneration processes of liver parenchyma. (55 Refs) (In GER)

13. PALLIATION OF LIVER METASTASES WITH COMBINED HEPATIC IRRADIATION AND MISONIDAZOLE. RESULTS OF A RADIATION THERAPY ONCOLOGY GROUP PHASE I-II STUDY.

Leibel SA, Order SE, Rominger CJ, Asbell SO
Dept. Radiation Oncology, Univ. California San Francisco, San Francisco, CA
Cancer Clin Trials; 4(3):285-293 1981

The management of symptomatic hepatic metastases continues to be a challenge. Although a significant palliative benefit can be achieved with external radiation alone, the total dose of irradiation which can be delivered to the liver is limited by the radiation tolerance of that organ. Recent studies have been directed at ways of rendering the tumor more radiosensitive relative to the normal tissue. A Phase I-II multi-institutional study was undertaken by the Radiation Therapy Oncology Group (RTOG) to study the use of the hypoxic cell sensitizing drug, misonidazole, for treatment of liver metastases. Fifty patients were accessioned to the study, of whom 42 were evaluable. Seventy-six percent of patients had GI primaries. Treatment consisted of radiation therapy to the whole liver delivering 2,100 rads in seven fractions with concomitant misonidazole, 1.5 g/m2 daily. The presence or absence of eight signs and symptoms were recorded prior to therapy and assessed periodically following treatment. The most frequent symptoms at the time of presentation included abdominal pain, weakness/fatigue, and anorexia. Hepatic irradiation was very effective in relieving abdominal pain, with 71% of patients showing improvement at the 4th wk assessment. Abdominal pain was completely relieved in 63% of patients presenting with this symptom. Fever and night sweats were completely relieved in 83% of patients. Constitutional symptoms such as anorexia and weakness/fatigue was improved in only 35% and 33%, respectively. While 19% of patients had a pretreatment Karnofsky status of 90, 45% had a max performance status of 90 at some point following treatment. There was a reduction of hepatic size based on clinical examination and/or scan by the 4th wk assessment in 36 patients. There was no change in 46% and progression in 18%. Reduction in hepatic size was correlated with improved survival. The median survival was 4.2 mo. Patients continued in a mild pain or pain-free status for 80% of their remaining av survival time. The relief or freedom from moderate or severe abdominal pain was maintained despite progression of other symptoms such as anorexia or weakness/fatigue. The major toxicity of this regimen was nausea and vomiting. There were no documented cases of radiation hepatitis or nephritis. A randomized prospective Phase III study is currently in progress comparing radiation therapy plus misonidazole to radiation therapy alone. (Author abstract) (32 Refs)

GENITOURINARY NEOPLASMS

14. CARCINOMA OF THE BLADDER TREATED BY INTERSTITIAL IRRADIATION.

Williams GB, Trott PA, Bloom HJ
Urology Unit, Royal Marsden Hosp. and Inst. Cancer Res., London, England
Br J Urol; 53(3):221-224 1981

A retrospective study is presented of 180 patients with clinically infiltrating transitional cell carcinoma of the bladder treated by interstitial irradiation. The cases were reclassified by clinical tumor extent and histopathological grade according to the UICC (1978) classification. The actuarial survival rates and complications are presented and treatment policy reviewed. (Author abstract) (6 Refs)

15. RESULTS OF THE COMBINED SURGICAL AND RADIOLOGICAL TREATMENT OF THE BLADDER CANCER WITH SPECIAL CONSIDERATION FOR THE RECURRENCE OF THE LOCAL TUMORS.

Hoffmann L, Gunther M, Kittner H, Hundemann B, Ziegler PG
Urologische Klinik, Wilhelm-Pieck Universitat, Ernst Heydemann Strasse 6, DDR 2500 Rostock 1, E. Germany
Z Urol Nephrol; 74(6):427-435 1981

Despite the advances in the bladder cancer therapy, the opinions vary widely about the optimal therapy. The 65 patients (48 men, 17 women; two thirds between ages 60-80 yr) received combined therapy from 1969-1977. The tumor recurrence was around 50%, it followed one to two yr after the irradiation and the tumors were predominantly spread throughout the bladder. These data indicate that a more radical surgery should have been performed. The high incidence of the bladder tumor recurrence should be taken into consideration, when planning the surgery, because the patients' survival time depends very much on the recurrence of the local tumors. (30 Refs) (In GER)

16. PROSTATIC CARCINOMA: TREATMENT WITH I125 INTERSTITIAL IRRADIATION AND PELVIC LYMPHADENECTOMY.

Mebust WK, Weigel JW, Reddy EK
Dept. Surgery, Univ. Kansas Sch. Medicine, 39th and Rainbow Blvd., Kansas City, KS, 66103
J Kans Med Soc; 82(6):278-281 1981

Treatment of patients with prostatic carcinoma confined to the prostate includes pelvic lymphadenectomy and 125I and in patients with positive nodes, supplementary external beam irradiation to the pelvic and periaortic nodes. A total of 50 patients (41-77 yr old) with stages A2, B1, and C prostatic carcinomas were treated. The av time of operation was 3.5 hr. This was the combined time for completion of the pelvic lymphadenectomy plus the insertion of the 125I pellets into the prostate. The technic of insertion of 125I needle is illustrated. Seventeen patients had 21 postoperative complications, the most common being transient scrotal or leg edema in 8 patients and prolonged drainage from the retropubic space in 4 patients. The av hospital stay was 10 days. In the postoperative period, all of the patients developed marked swelling and induration of the prostate but this subsided in the majority by 1 yr. Delayed complications included edema of the legs (8 patients), dysuria and urinary frequency (9 patients), and impotence (1 patient). The role of post-therapy prostatic biopsy is discussed. (5 Refs)

17. CYTOTOXIC CHEMOTHERAPY COMBINED WITH RADIOTHERAPY FOR ADVANCED PROSTATIC CANCER: HISTOPATHOLOGICAL EVALUATION.

Uyama T, Moriwaki S, Nakamura S
Dept. Urology, Natl. Hosp., Cancer Center of Shikoku, Shikoku, Japan
Gan No Rinsho; 27(9):1125-1130 1981

Twelve patients (65-85 yr old) with prostatic cancer who were treated with combination chemotherapy (bleomycin, [B], and adriamycin, [A], or mitomycin, [M]) and radiotherapy were reported. Nine of the patients were administered iv B (2.5 mg in 500 ml glucose via drip infusion) during a 6-day period and iv injections of A (20 or 50 mg) on day 7 or days 6 and 7; this schedule was considered to be one course of regimen BA. The other three patients were administered iv B (2.5 mg in 500 ml glucose via drip infusion) during a 6-day period and one iv injection of M (10 mg); this schedule was considered to be one course of regimen BM. All patients were given Co irradiation delivered by means of a 12 million electron volt Linac apparatus in fractions of 200 rads, 5x/wk (total 3,000-7,000 rads). On the basis of Shimosato's classification system of therapeutic effect, three patients had Grade IIa results, two had Grade IIa-IIb, two had Grade IIb, and one had Grade IVb. The combination therapies were thought to be effective in induction therapy for prostatic cancer, and the use of 1-(2-tetrahydrofuryl)-5-fluorouracil as maintenance therapy was under investigation. (20 Refs) (In JPN)

18. RESPONSE OF LYMPH NODE METASTASIS TO SEQUENTIAL ESTROGEN AND RADIATION THERAPY IN PROSTATE CARCINOMA.

Green N, Bodner H, Broth E, Garrett G, Goldberg H, Goldstein A, Polse S, Skaist L, Treible D, Wallack H
Div. Radiation Therapy, Valley Presbyterian Hosp., 15107 Vanowen St., Van Nuys, CA, 91405
Urology; 18(2):137-142 1981

Increasingly sophisticated diagnostic studies have shown a high incidence of tumor spread to the regional lymph nodes. The status of the lymph nodes has been evaluated by noninvasive diagnostic procedures such as lymphangiography and computerized axial tomography. The applicability of these procedures has been enhanced by the use of stringent criteria. Gross lymph node metastasis can be diagnosed with considerable confidence. Serial observations of lymphangiograms and computerized axial tomograms before and 2 mo after the administration of estrogens provide an added dimension to the interpretation of lymph node metastasis. The nature and range of the response of lymph node metastasis were observed. Survival of patients with gross lymph node metastasis treated by sequential estrogen and radiation therapy was evaluated. A total of 11/18 (61%) of patients remained free of symptoms. 8/11 (74%) with a favorable lymph node metastasis responsive to estrogen therapy, and 3/7 (42%) with lymph node metastasis refractory to estrogen therapy. Follow-up computerized axial tomograms of the lymph nodes done at 1 and 2 yr after irradiation showed a persistent favorable response. Five patients are alive with disease, and two patients died of the disease. (Author abstract) (25 Refs)

19. MONITORING TESTICULAR FUNCTION IN IRRADIATED PATIENTS: PRELIMINARY RESULTS (MEETING ABSTRACT).

Maiuta S, Calzavara F, Scorretti C, Cortivo P, Uzzielli G
Divisione di Radioterapia e Medicina Nucleare, Ospedale Civile di Padova, Padova, Italy
Tumori; 67(2,SupplA):81 1981

In order to establish the magnitude of damage to the reproductive capacity of males as a result of radiotherapy, we repeatedly checked the seminal fluid of a group of patients treated with radiotherapy to subdiaphragmatic lymphatic sites. In all 69 patients were examined, of whom 27 had Hodgkin's disease and 42 pure semi oma of the testis. Criteria chosen for inclusion in the study were: age, performance status (PS), and previous history; excluded from the study were patients below 20 or over 55 yr old, with PS below 100, with antecedent orchitis, atrophic testis, gonadal dysgenesis, venereal diseases or diabetes, and lastly, those believed to be exposed to radiation in their occupations. The patients were all consenting and were periodically informed of the outcome of the examinations. The subjects were checked for testicular function by seminologic examination and measurements of blood follicle stimulating hormone, luteinizing hormone and testosterone levels. Ejaculates were obtained by masturbation preceded by a period of at least 3 days of sexual abstinence; the total vol of th ejaculate, concentration of spermatozoa, and their motility during the next 6 hr were measured as well as their morphology. The patients were irradiated with a linear accelerator having a max energy of 8 MeV with doses ranging from 3600 to 4000 rad and individualized opposed fields; in 62 cases inverted Y fields were used, whereas in 7 we resorted to irradiation of just para-aortic lymph node sites. From the check-ups performed at an interval of approx 1 mo from the last fraction of radiotherapy in which the inverted fields had been used, all of the patients, except 1, proved azoospermic, whereas among patients who had been subjected to just irradiation of the para-aortic lymph nodes only those who had previously been treated with poly-chemotherapy (6 cycles of nitrogen mustard, vincristine, prednisone, procarbazine (MOPP)) turned out to be azoospermic. As reported earlier, only one of these showed a resumption of testicular function when examined more than 5 yr after treatment. In all 9 patients showed signs of renewed testicular function after varying intervals beginning 3 mo after treatment; in particular, the 3 with seminomas were found to be normospermic. (no Refs) (In ITA)

20. CARCINOMA OF PENIS. REVIEW OF CASES TREATED BY SURGERY AND RADIATION THERAPY 196 0-1977.

Krieg RM, Luk KH
Claire Zellerbach Saroni Tumor Inst., 1600 Divisadero St., San Francisco, CA, 94120
Urology; 18(2):149-154 1981

Cases of squamous cell carcinoma of the penis treated by surgery and radiation therapy at Moffitt Hospital, University of California, and Mount Zion Hospital and Medical Center are reviewed. Only cases followed for more than 3 yr or with autopsy findings are presented. For the primary lesion, over-all surgical control rate locally was 15/17 or 88%. Overall control rate with radiation therapy alone was 9/12 (75%), and with surgical salvage 11/12 (92%). Radiation therapy appears to be the treatment of choice for early stage lesions, reserving surgery for salvage. Prophylactic ilioinguinal lymph node dissection for N0 lesions is not warranted. The role of chemotherapy needs further investigation. (Author abstract) (18 Refs)

GYNECOLOGIC NEOPLASMS

21. FIRST EXPERIENCES WITH INTRAPERITONEAL RADIOTHERAPY USING COLLOIDAL 32P (MEETING ABSTRACT).

Bignardi M, Bertoni F, Vanoli P, Cinquepalmi N, Cosentino D
Ospedale di Circolo di Varese, Varese, Italy
Tumori; 67(2,SupplA):142 1981

Since September, 1980, at the Department of Radiotherapy of the Varese Group Hospital, we have treated 8 stage I ovarian carcinoma patients with colloidal 32P ip radiotherapy. These patients who had undergone surgery a few days before, turned out to belong to risk categories (Ib-Ic). Hence, after superficial anesthesia, we introduced an amount of 32P equal to 15 mCi, in the form of a colloidal suspension of 32P-labeled chromium hydroxide in 2-3% gelatin with av micelle size equal to 0.1 microns, into the abdominal cavities of the patients with ordinary paracentesis needles. The procedure required only a minimum of safety measures and manipulation. A tracer was combined with the 32P permitting scintigraphic monitoring of the distribution of the colloid which turned out to be quite homogeneous in all of the cases treated. The patients were admitted for just one day of observation; there are no protection problems because 32P is a pure beta-emitter with penetration capacity of a few mm. The side effects of treatment proved acceptable: transient hyperthermia, abdominal pain, nausea. Some of the cases we treated have already undergone laparoscopy or laparotomy and the results are encouraging since there is no evidence of either abdominal recurrence or changes attributable to therapy with 32P. (no Refs) (In ITA)

22. THE 'MOVING STRIP TECHNIC' A STILL USEFUL RADIOTHERAPEUTIC TECHNIC? (MEETING ABSTRACT).

Baroncelli G, Marchetti G, Micheletti E, Morrica B
Spedali Civili di Brescia, Brescia, Italy
Tumori; 67(2,SupplA):141 1981

Beginning with scrutiny of the case series of the 'O Alberti' Radium Institute of the Civil Hospitals of Brescia which includes 26 patients with stage III tumors of the ovary (International Federation of Gynecologists and Obstetricians [FIGO]) treated by the 'moving strip' technic from 1971 to 1975 and with a minimum period of observation of 5 yr, the authors have analyzed the causes of success and failure with this technic sometimes unfairly forgotten. The best results for clinical cure at 5 yr occurred in patients in whom, regardless of abdominal dissemination, metastases did not exceed a diameter of 1 cm in size. Failure, on the other hand, occurred in cases of residual neoplasm, even if solitary, but more than 1.5 cm in diameter. On the whole treatment was well tolerated without important enough changes in the blood picture to require suspension of treatment. Failures were mostly manifested by pelvic recurrence. In conclusion, the 'moving strip' appears to be a technic which on the whole is fairly well tolerated and nevertheless retains one of its present strengths in the treatment of stage III carcinoma of the ovary with minimal disease (size less than or equal to 1 cm in diameter). This technic does not preclude the possibility, currently raised, of proper chemotherapy. Finally, the use of 'moving strips' to consolidate the results of earlier chemotherapy seems rich with future possibilities. (no Refs) (In ITA)

23. A STUDY ON 333 PATIENTS WITH ADENOCARCINOMA OF THE ENDOMETRIUM TREATED BY COMBINED SURGERY AND RADIATION THERAPY (1958-1978).

Reboul F, Andine JP, Bossi G, Reboul G
Service de Radiotherapie, Clinique Sainte-Catherine, 84000 Avignon, France
Ann Chir; 35(6):389-395 1981

A retrospective study of 333 patients (34-92 yr old) with primary endometrial cancer treated between 1958 and 1978 was performed in an attempt to identify the principle clinical and prognostic parameters and to determine the value of the results of the different therapeutic regimens used. Only 2/333 patients were lost to follow-up. The 5-yr survival rate was 59.1%. At 20 yr the survival rate was 21.4%. Premenopausal patients (73.2%) showed better survival rates than did peri-menopausal (59.9%) and postmenopausal (57.0%) patients. The 5-yr survival rates were 67.0% for Stage I patients (204) and 60.0% for Stage II patients (40). Poorly differentiated tumors showed the lowest 5-yr survival rate (5.9%) as compared with medium- (52.7%) and well-differentiated tumors (64.4%). The 5-yr survival was 69.1% in the 203 patients treated by radiotherapy plus surgery. In the 85 patients considered to be inoperable and treated by radiotherapy alone, the 5-yr survival rate was 35.2%. Of the 45 patients treated for tumor recurrence or metastasis, 35 had been treated by surgery alone, 7 by radiotherapy alone, and 3 by combined radiotherapy and surgery. The therapeutic complications are described. The implications of these results are discussed. (1 1 Refs) (In FRE)

24. RADIOSURGICAL TREATMENT OF CARCINOMA OF THE CERVIX: EFFECT OF RADIOTHERAPY ON PARAMETRIAL STATUS (MEETING ABSTRACT).

Simonodi P, Fessia L, Giardina G, Zola P, Sinistrero G
Clinica Ostetrica e Ginecologica A, Universita di Torino, Turin, Italy
Tumori; 67(2,SupplA):148 1981

We used semiserial histologic examination to evaluate our series of 198 parametria removed following curietherapy for stage T1a, T1b, and T2a carcinoma of the cervix and a series of 108 parametria removed following preoperative radiation therapy at another site. Histologic examination was performed by the same pathologic anatomy service and the staging methods are comparable. From this analysis it turns out that only 2 out of 198 parametria were infiltrated with neoplasm whereas in a comparison series the number of infiltrated parametria was 13 out of 108. This result on the one hand confirms the validity of preoperative curietherapy and on the other seems it might constitute a rational basis for performing less aggressive surgery on the parametrium thereby reducing the complications. (no Refs) (In ITA)

HEAD AND NECK NEOPLASMS

25. RESULTS OF RADIOTHERAPY AND COMBINED TREATMENT OF CANCER OF THE MUCOUS MEMBRANE OF THE PARANASAL SINUSES AND NASAL CAVITY.

Borisevich NV, Baimakanova SSh, Rakhmetova AU
Kazakh Res. Inst. Oncology and Radiology, Alma-Ata, USSR
Med Radiol (Mosk); 26(7):21-27 1981

Comparative efficacy of radiotherapy, chemotherapy and combined treatment was studied in 180 patients (118 men, 62 women; mean age 52.1 yr) with cancer of the mucous membrane of the paranasal sinuses. There were 17 patients with Group II, 117 with Group III and 46 with Group IV; 111/180 had squamous cell carcinomas. Of 180 patients, 61 received surgery and pre- or postoperative distant gamma therapy (Group I), 43 received chemotherapy and radiotherapy (Group II), and 76 received distant radiotherapy (Group III). Radiotherapy was given in small (200 rads), median (350-400 rads) or large (800-1,000 rads) fractions. The 5-yr survival of the patients with Stage III was 25.% in Group I, 17.4% in Group II, and 21.6% in Group III. The 5-yr survival of the patients with Stage IV was 0% after radiochemotherapy and 14.8% after radiotherapy alone. Irradiation with small and median fractions was slightly more effective in the patients with Stage IV, while irradiation with large fractions provided slightly better results in the patients with Stage III. The 5-yr survival in the patients with Stage II was 80.0% in Group III and 72.7% in Group I. (11 Refs) (In RUS)

26. MANDIBULAR OSTEORADIONECROSIS IN CANCER OF TONGUE - TIME-DOSE CONSIDERATION.

Okuyama T, Horiuchi J, Shibuya H, Takeda M
Dept. Radiology, Sch. Medicine, Tokyo Medical and Dental Univ., Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 41(4):365-373 1981

Mandibular osteoradionecrosis encountered in a series of 104 cases of tongue cancer surviving over 2 yr following radiotherapy during a period from 1964 to 1975 was analyzed based upon the time-dose consideration and TDF concept. The cases were divided into two groups, since the therapeutic regimen was different in each group; 34 cases in the first group were treated during a period from 1964 to 1968 and 70 cases in the second group were treated thereafter. The incidence of the mandibular osteoradionecrosis was higher in the first group (14/34 = 41%) than the second group (7/70 = 10%). The osteoradionecrosis also more severe in the former than the latter group. The osteoradionecrosis could not be found in the patients treated with interstitial radiotherapy alone in both groups, even though a dose level up to 80 Gy/4 days or 100 Gy/7 days, or more, was given. In the combined external and interstitial irradiations, the time factor (over-all period) appeared to play an important role in production of the mandibular osteoradionecrosis. A high incidence of the osteoradionecrosis was encountered when a total dose of 90 Gy-120 Gy was irradiated for an over-all period of less than 40 days. It was, however significantly decreased when the period was prolonged over 50 days. With regard to TDF analysis, the osteoradionecrosis was observed in the patients who received more than 150 of additive TDF values (more than 100 for interstitial and 50 for external irradiation). In addition, TDF value of external irradiation was much more closely related to the osteoradionecrosis than that of interstitial irradiation. Finally, the permissible dose level or time-dose relationship could hardly be clarified for mandibular osteoradionecrosis in the patients with tongue cancer, since the dose level was inevitably superimposed to the curable dose to the carcinoma. When combined therapy of external and interstitial irradiation was used for treatment of carcinoma of the tongue, a total dose of 90-100 Gy for a period over 50 days, or a total TDF value of 160-170 with the max limitation being 50 for external irradiation might be optimal for local control, and also be acceptable from a viewpoint of the complication of mandibular osteoradionecrosis because its incidence was kept below 10% of total treated cases. (Author abstract) (14 Refs) (In JPN)

27. COMBINED THERAPY FOR ADVANCED CARCINOMA OF THE UPPER AND LOWER GUM - WITH PARTICULAR REFERENCE TO RADICAL LOCAL CLEANING OPERATION.

Ohya T, Numaguchi R, Miyasawa M, Ishibashi K, Fujimori S, Ito N, Kudo K, Fujioka Y
First Dept. Oral Surgery, Iwate Medical Coll. Sch. Dentistry, Iwate Prefecture, Japan
Nippon Gan Chiryo Gakkai Shi; 16(1):44-50 1981

Thirteen patients (9 men, 4 women; 44-75 yr old) with carcinoma of the gum (5 upper and 8 lower gums) were treated with chemotherapy and radiotherapy were reported. Squamous cell carcinom a was observed in 12 and adenocarcinoma in 1. All of the patients were classified according to the International Union Against Cancer, a TNM system as T4 and M0, while two were N2, three were N1, and seven were N0. Five of the patients were administered 5-fluorouracil (125-250 mg/dose, 5-6x/day, total 625-1,500 mg) via iv injection, and eight of the patients were administered pepleomycin sulfate (NK 631; 5-10 mg/dose, 5-6x/day, total 25-60 mg) via ia infusion or iv injection. Approx 30 min after the drugs were administered, the patients were given preoperative 60Co irradiation (200 rad fractions, 5-8 fractions/day, total 1,000-1,600 rads). Radical local cleansing surgery was performed 1-2 days after completion of the combination therapy. Except for one patient who died 10 mo postoperatively of renal insufficiency, all patients were alive, and the disease was well controlled 1-3.5 yr postoperatively. Local recurrence that occurred in one patient and lymph node metastases that occurred in two patients were successfully treated with with removal of the tumor tissue. (11 Refs) (In JPN)

28. RADIOTHERAPY IN MANAGING LARYNGEAL CARCINOMA.

Chung CK, Stryker JA, Strauss M, Connor G
Radiation Oncology Div., Milton S. Hershey Medical Center, Hershey, PA
Pa Med; 84(7):44-48 1981

The general management and use of radiotherapy (RT) associated with the surgical treatment of 71 patients with squamous cell carcinoma of the larynx (59 males, 12 females; highest age incidence 7th) are presented. Seven of 41 who had primary RT developed local recurrence; 5 were salvaged by subsequent surgery with 5% ultimate local failures. In the entire series, 93% treated by primary RT and 6/30 treated by combined surgery + RT experienced voice preservation. Examination of surgical specimens indicated sterilization of 45% of the primary tumors and 68% of the nodes. The 2-yr survival without evidence of disease was 91% (29/32) for Stages I and II, 5/9 for Stages III and IV treated by RT alone, and 17/22 for Stages III and IV treated by preoperative RT. There was no significant difference in the development of distant metastases between patients treated with RT alone or by combined therapy. (25 Refs)

29. COMPARISON OF PREOPERATIVE AND POSTOPERATIVE RADIATION THERAPY FOR PATIENTS WITH CARCINOMA OF THE HEAD AND NECK.

Snow JB, Gelber RD, Kramer S, Davis LW, Marcial VA, Lowry LD
Dept. Otorhinolaryngology, Univ. Pennsylvania, 3400 Spence St. G1, Philadelphia, PA, 19074
Acta Otolaryngol (Stockh); 91(5/6):611-626 1981

Three hundred and fifty-four patients with squamous cell carcinoma of the oral cavity, oropharynx, supraglottic larynx, hypopharynx or maxillary sinus have been randomized for preoperative radiation therapy and surgery versus surgery and postoperative radiation therapy plus, in the case of patients with lesions of the oral cavity and oropharynx, radical radiation therapy. Data have been analyzed on 320 patients in this interim report. In the supraglottic larynx group local-regional control is significantly better for surgery and postoperative radiation therapy. The treatment differences in local-regional control in the oral cavity oropharynx and hypopharynx groups are not statistically significant. No statistically significant treatment differences exist for survival in all sites or in any site; continued follow-up is necessary to make definite treatment comparisons. (Author abstract) (5 Refs)

30. PI MESON RADIOTHERAPY FOR ADVANCED HEAD AND NECK NEOPLASMS: PRELIMINARY RESULTS.

Khan KM, Bush S, Herzon F, Kligerman MM
Cancer Res. and Treatment Center, Univ. New Mexico, 900 Camino de Salud NE, Albuquerque, NM, 87131
Head Neck Surg; 3(5):384-388 1981

The therapeutic efficacy of negative pi meson radiotherapy alone or in combination with conventional radiation and/or surgery was evaluated in 26 patients with locally advanced carcinoma of the head and neck. Pi meson doses ranged from 1,000 peak pion rads in 7 fractions over 9 days to 5,400 peak pion rads in 51 fractions over 84 days. The patients were followed up for 9-33 mo. Of 26 patients, 12 were alive (10/12 were free of disease). Survival and local control improved with increasing doses up to 5,000 rads (there were no survivors after less than 2,700 rads). Local control was achieved in 4/10 patients subjected to pions alone and in 6/16 patients subjected to pions plus x rays or surgery. side-effects of pion radiotherapy included skin erythema, mucosal injection, xerostomia, moist desquamation, confluent mucositis, and complete dysfunction of salivary glands. Radiation reactions were recorded in 3/16 patients irradiated with less than 4,000 rads and in 10/10 patients irradiated with greater than 4,000 rads. (7 Refs)

31. COMBINED RADIOTHERAPY AND BLEOMYCIN FOR ADVANCED HEAD AND NECK CANCERS: RESULTS OF A PHASE I PILOT STUDY.

Silverberg IJ, Phillips TL, Fu KK, Chan PY
The Cancer Res. Inst., 45 Castro St., San Francisco, CA, 94114
Cancer Treat Rep; 65(7/8):697-698 1981

Forty-two patients with inoperable Stage III or IV head and neck epithelial tumors were entered in a Phase I pilot study to evaluate the toxicity and efficacy of combined radiotherapy and bleomycin for advanced head and neck cancers. Twenty-three patients (52%) achieved complete remissions and 18 patients (42%) had greater than 50% regression. Most patients tolerated bleomycin at a dose of 5 units twice a wk, with a full course of radiotherapy delivered at 180 rads/day, 5 days/wk. Although the complete remission rate appears to be higher than with radiotherapy alone and 13 of the 23 complete remissions (57%) lasted greater than 1 yr, methods of prolonging the duration of remission need to be developed. (Author abstract) (8 Refs)

32. EFFECT OF BLEOMYCIN-RADIOTHERAPY COMBINATION IN MANAGEMENT OF HEAD AND NECK SQUAMOUS CELL CARCINOMA.

Shah PM, Shukla SN, Patel KM, Patel NL, Baboo HA, Patel DD
Gujarat Cancer and Res. Inst., New Cival Hosp. Compound, Asarva, Ahmedabad-380 016, India
Cancer; 48(5):1106-1109 1981

Twenty-five patients with head and neck squamous cell carcinoma were treated with bleomycin-radiotherapy protocol, 15 mg bleomycin iv on alternate days followed by radiation within half an hr. The av total dose of bleomycin was 150 mg. Radiotherapy was given daily. Two patients were lost to follow-up very early in the course of the treatment and were removed from the study for statistical purposes. Thirty-six patients with head and neck squamous cell carcinoma who were treated with radiotherapy alone during the same period were used as controls. The patients were followed for 2 yr. The incidence of response rate did not differ significantly between regimens; however, the incidence of side effects with bleomycin-radiotherapy, 82.61%, is significantly more than that of radiotherapy alone (52.78%). Median survival time (MST) of those responding to bleomycin-radiotherapy protocol was 7 mo and 12 days and for radiotherapy responders was 6 mo. Neither the response rate nor the MST improve significantly after pretreatment with bleomycin. On the contrary, the incidence of side effects increased significantly. (Author abstract) (22 Refs)

33. HYPOTHALAMIC, PITUITARY, AND THYROID DYSFUNCTION AFTER RADIOTHERAPY OF HEAD AND NECK TUMORS (MEETING ABSTRACT).

Samaan NA, Siekavizza J, Schultz P, Maor M, Sampiere VA, Cangir A, Jesse RH
Departments of Medicine, Radiotherapy, Physics, Pediatrics and Surgery, The University of Texas System Cancer Center, M. D. Anderson Hospital and Tumor Institute Houston, TX, 77030
Long Term Normal Tissue Effects of Cancer Treatment, April 13-15, 1981, Bethesda, Maryland Committe for Radiation Oncology Studies; 1981

We studied 110 patients with nasopharyngeal cancer and paranasal sinus tumors, who were free of the primary disease, one to 26 yr following radiotherapy. There were 65 males and 45 females. They were four to 75 yr of age with a mean of 36.5 yr. During therapy, both the hypothalamus and the anterior pituitary gland were in the field of irradiation. The dose of radiotherapy to the hypothalamus and the anterior pituitary gland was estimated to be 2,000 to 10,000 rads. In presence of lymph node metastasis, the larynx was shielded in some patients and the neck was irradiated, thus shielding the thyroid isthmus, but the thyroid lobes received 2,000 to 8,800 rads. We found evidence of a hypothalamic lesion in 71 patients, and an anterior pituitary lesion in 39. Sixty-one of the 110 patients received radiotherapy to the neck re gion for treatment of lymph node metastasis, and 22 developed hypothyroidism. Hyperprolactinemia in absence of radiological changes in the sella turcica was found in 62 patients indicating destruction of the prolactin inhibitory center. One young adult female, who developed galactorrhea and amenorrhea two yr following radiotherapy and also showed a high serum prolactin level but normal anterior pituitary function and sella turcica, regained her menses and a normal pregnancy following Bromocriptine therapy. These results indicate that endocrine deficiencies after radiotherapy of tumors of head and neck are common and should be detected early and treated. Long-term follow-up of these patients is indicated since complications may appear yr after the completion of radiotherapy and the patient may die of endocrine deficiencies in spite of the cure of the primary disease. However, endocrine deficiency may be an acceptable consequence of treatment for a potentially fatal disease. (no Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

34. MANTLE FIELD IRRADIATION FOR STAGES IA AND IIA HODGKIN'S DISEASE.

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Norwegian Radium Hosp., Montebello, Oslo 3, Norway
Scand J Haematol; 26(4):306-310 1981

Between 1970 and 1975, 73 patients with surgically staged IA and IIA Hodgkin's disease, localized above the diaphragm, were treated with mantle field irradiation only. Twenty-four patients relapsed during the first 5 yr after the primary treatment, but 14 of them obtained long-lasting complete remission after retreatment. Twenty-three patients with lymphocyte-depleted histology, more than 3 sites involved or a mediastinal mass of more than 6 cm had a high relapse rate (60%); these patients need treatment additional to the mantle field irradiation. The other 50 patients had an 80% relapse-free survival, 96% complete remission after treatment of the first relapse, and 98% survival after 8 yr. We propose that such patients should receive mantle field irradiation only, as the primary treatment. (Author abstract) (25 Refs)

35. MULTIPLE CHEMOTHERAPY (MOPP) FOLLOWED BY EITHER FOCAL OR SELECTIVE RADIOTHERAPY IN CLINICAL STAGES IA AND II2A OF HODGKIN'S DISEASE: RESULTS AFTER FOUR YEARS OF THE USE OF PROSPECTIVE SCHEDULE (H 7701) IN 79 PATIENTS.

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Bull Cancer (Paris); 68(3):217-223 1981

Seventy-nine patients with clinical stages IA, or II2A of Hodgkin's disease were treated from January 1977 to April 1980 by a multiple therapy schedule, H 7701. Three courses of MOPP [methylchlorethamine, vincristine, procarbazine, prednisone] chemotherapy were first given to all patients. They were than randomly allocated to two groups: group 7701 S (38 patients) was treated by mantle irradiation, excluding the mediastinum when this was not initially involved, or inverted Y radiotherapy; group 7701 F (41 patients) was treated by focal irradiation only. After follow-up for 9-48 mo (median: 26 mo), overall survival was 98.6% and relapse-free duration 94.9%. No statistical difference exists between the two randomized groups. Four patients relapsed; three are now free of disease after further treatment, while one patient has since died. With this chemotherapy-radiotherapy selective or focal sequence, staging laparotomy is not indicated. Results and side effects of this treatment schedule are compared with those of other treatment strategies. (Author abstract) (31 Refs) (In FRE)

36. RADIOLOGIC AND SPIROMETRIC EVALUATION OF LATE MEDIASTINO-PULMONARY DAMAGE FOLLOWING RADIOTHERAPY FOR HODGKIN'S DISEASE (MEETING ABSTRACT).

Zocali R, Pagnoni AM, Zanni M, Santoro A, Uslenghi C
Istituto Nazionale Tumori, Milan, Italy
Tumori; 67(2,SupplA):75 1981

One hundred thirty-one patients with Hodgkin's disease treated with various therapeutic modalities were examined by chest x-ray and spirometry in order to evaluate post-irradiation fibrosis and functional respiratory damage. 42 patients had been treated with radiotherapy alone (av dose to the mediastinum, 40.52 Gray (Gy), 58 with radiotherapy + nitrogen mustard, oncovin, procarbazine, and prednisolone (MOPP) (34.66 Gy), 31 with radiotherapy + adriamycin, bleomycin, vinblastine, and dacarbazine (ABVD) (34.46 Gy). Evaluation was performed the same day at least 6 mo after the conclusion of radiotherapy. The fibrosis found on radiologic examination and the respiratory deficit on spirometry were classified separately by radiologists and physiopathologists, and finally the data were compared. The two methods of investigation yielded similar results: 30-35 per cent pathologic findings, 70-65 per cent normal findings. Factors related to a lower incidence of pathologic findings were low doses of radiotherapy (individual dose and total dose), the 'split-course' technic and young age of the patients. In the radiotherapy (RT) + ABVD group there was a higher incidence of injury than the RT + MOPP group (49 per cent as opposed to 15-20 per cent). In any event, no more than 6-8 per cent of the 131 patients had subjective clinical symptoms of respiratory insufficiency. (no Refs) (In ITA)

37. ABSCOPAL REGRESSION IN LYMPHOMA: A MECHANISM IN COMMON WITH TOTAL BODY IRRADIATION?

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Clin Radiol; 32(4):475-480 1981

The hospital records of 895 patients presenting to this center with a diagnosis of Hodgkin's or non-Hodgkin's lymphoma have been reviewed. In the records of 26 patients there was evidence fo r or against the occurrence of abscopal regression with radiotherapy. Attention is drawn to inevitable inaccuracy in a retrospective study of this type. Evidence of abscopal regression was seen in the records of 10 patients, 4 with Hodgkin's and 6 with non-Hodgkin's lymphoma. It is suggested that this phenomenon is elicitable in more patients than is commonly recognized, and that together with response to low dose total body irradiation, could be explained by radiation damage to normal lymphocyte. (Author abstract) (24 Refs)

38. OSTEONECROSIS IN PATIENTS WITH MALIGNANT LYMPHOMA: A REVIEW OF TWENTY-FIVE CASES.

Engel IA, Straus DJ, Lacher M, Lane J, Smith J
Dept. Radiology, Memorial Sloan-Kettering Cancer Center, 1375 York Ave., New York, NY, 10021
Cancer; 48(5):1245-1250 1981

A retrospective study of 25 patients with malignant lymphoma who had osteonecrosis of either the femoral or humeral head(s) was undertaken. The common factor present among all patients was the administration of intermittent steroid-containing combination chemotherapy. Seventeen Hodgkin's disease patients received chemotherapy predominantly consisting of an alkylating agent, vincristine, procarbazine, and moderate amounts of prednisone. The non-Hodgkin's lymphoma patients were on various moderate dosage steroid-containing protocols, except three who received prolonged high-dose steroid-containing chemotherapy regimens. Sixteen of the 17 Hodgkin's disease patients and five of the eight non-Hodgkin's lymphoma patients received radiotherapy to the bones that subsequently developed osteonecrosis. Two of the three non-Hodgkin's lymphoma patients who were not irradiated were treated with high-dose steroid-containing chemotherapy regimens. Symptoms developed in patients 12 mo and 32 mo after completion of chemotherapy and radiotherapy, respectively. Osteonecrosis was a long-term complication of treatment between 1970 and 1979 and occurred in 1.6% of the Hodgkin's disease and 0.12% of the non-Hodgkin's lymphoma patients treated. The authors conclude that the patients at highest risk for this complication are those who receive both radiotherapy to the affected bone(s) and intermittent steroid-containing multiple drug chemotherapy. (Author abstract) (24 Refs)

39. SPLENIC INJURY CAUSED BY THERAPEUTIC IRRADIATION.

Dailey MO, Colemen CN, Fajardo LF
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Am J Surg Pathol; 5(4):325-331 1981

The pathologic features associated with external radiation of the spleen are described based on the study of 37 spleens obtained at necropsy from patients with Hodgkin's disease (HD: 22 treated with radiation, 15 not treated with radiation). An additional six cases (3 irradiated, 3 unirradiated), in which a tumor was present in the spleen at autopsy, were also examined for comparison, as were eight splee ns from patients with non-Hodgkin's lymphomas (NHLs), which had been irradiated. The pathologic changes were identical whether the patient had been treated for HD or for NHL. The median wt of irradiated spleens was 1/3 that of unirradiated spleens (75 vs 210 g, p less than 0.0001). Many of the irradiated spleens were shrunken and scarred. Many irradiated spleens had capsules thickened by collagen deposition. There was moderate to severe depletion of the white pulp in 12/22 irradiated HD patients and in 6/8 NHL patients. Three factors appeared to affect the splenic lymphoid compartment: irradiation, chemotherapy, and the disease process itself. Irradiation seemed to cause collapse of the splenic architecture, with close apposition of trabeculae, in over 1/2 of the irradiated specimens. In 8/22 of the irradiated HD spleens, there was a mild diffuse increase in the collagen throughout the cords of the red pulp, with a more severe degree of diffuse fibrosis present in an additional 11. The splenic vasculature was abnormal in 19/22 irradiated HD patients and 7/8 NHL patients. The tumorous spleens showed identical features of radiation injury. It was suggested that the changes observed are characteristic of delayed radiation injury to the spleen. (16 Refs)

40. GONADAL RECURRENCES IN ACUTE LYMPHOBLASTIC LEUKEMIA (ALL) IN CHILDHOOD (MEETING ABSTRACT).

Pastore G, Saracco P, Cordero Di Montezemola L, Grazia E, Miniero R, Morgando MP
Istituti Pediatrici, Universita degli Studi di Torino, Torino, Italy
Tumori; 67(2,SupplA):101 1981

Nine testicular recurrences (11 per cent) (TR) and 1 ovarian recurrence (1.5 per cent) (OR) were observed in 142 children (79 males, 63 females) with acute lymphoblastic leukemia (ALL) in its first complete remission (CR). The median time

interval between CR and TR was 29 mo (range 12-43); at the time of TR 2 patients were off-therapy. In 1 child asymptomatic testicular infiltration was diagnosed by bilateral biopsy when treatment was stopped. Of the 9 patients with TR 8 had later recurrences (4 in the bone marrow, 3 meningeal and a second TR) and, of these, 7 are deceased with a median survival of 43 mo. A single patient is in hematologic remission 43 mo following TR. In 6 cases local irradiation (1800-2400 rads) and inductive chemotherapy were performed, in 2 cases orchiectomy and maintenance chemotherapy and in 1 patient chemotherapy alone. The interval between CR and OR was 72 mo and at the time of recurrence the child was off-therapy. The patient succumbed 13 mo after recurrence, after an initial response to therapy (local irradiation and induction chemotherapy). These findings confirm the unfavorable evolution of the disease following a gonadal recurrence, regardless of the treatment provided. The problem of a possible prevention with cobalt teletherapy was then discussed. (no Refs) (In ITA)

MUSCULOSKELETAL NEOPLASMS

41. FUNCTIONAL GROUPS OF LYMPHOCYTES AND EFFICACY OF RADIOTHERAPY IN PATIENTS WITH OSTEOGENIC SARCOMA OF THE EXTREMITIES.

Sokolova II, Kuznetsova IP, Repina FF, Bolko AV
P. A. Hertsen Res. Oncological Inst., Moscow, USSR
Med Radiol (Mosk); 26(7):27-32 1981

The blast-transformation (BT) index and the count of acid phosphatase (AP)-positive lymphocytes were determined in 31 patients (22 men, 9 women, 12-32 yr old) with osteogenic sarcoma of the extremities. Distant gamma therapy (1,800-2,000 rads/wk, total dose 6,000-10,000 rads) produced complete regression of the soft tissue tumor component in 22 patients and partial regression in 4; radiotherapy was ineffective in 5 patients. Within 6 mo after termination of the radiotherapy, 13/31 patients developed lung metastases. The pretreatment ratio of (BT-,AP-) and (BT-,AP+) lymphocytes was found to determine the prognosis: the patients with the ratio of 0.9 survived for greater than 1 yr, while the patients with the ratio of 3.8 died within the first 1 yr of the treatment. (12 Refs) (In RUS)

42. POLYCHEMOTHERAPY COMBINED WITH RADIOTHERAPY WITH RADIATION-SENSITIZING AGENTS IN THE TREATMENT OF ADVANCED SOFT TISSUE SARCOMAS (MEETING ABSTRACT).

Scoppa G, Comella G, Silvestro P, Scarpa A, Comella P, Coucourde F, Zarrilli D, Perrone V
Istituto per lo Studio e la Cura dei Tumori di Napoli, Naples, Italy
Tumori; 67(2,SupplA):192 1981

Since January, 1980, 11 patients (p) (8 p in stage IIb and 3 in stage IIIa) have undergone polychemotherapy with the following drugs: dactinomycin (DACT) 450 ug/square m (sqm) iv days 1,2,3,4,5, adriamycin (ADM) 20 mg/sqm iv days 19,21,35,37, vincristine (VCR) 1.5 mg/sqm iv days 51,58,65,72, cytoxan (CTX) 1200 mg/sqm iv days 51, 65; treatment was repeated at day 90. The same day the first cycle was begun the p underwent cobalt teletherapy in a dose of 5-7 Gray (Gy) per session, once per wk, for a total dose of 42/50 Gy; 2-3 hr before the radiotherapy session the p took metronidazole in a dose of 4-6 g/sqm po. Responses to therapy were categorized thus: complete remission (CR), partial remission (PR), stabilization (SD), progression (PD). Seven p (63.5 per cent) obtained a PR, 3 p (27.5 per cent) a SD, and 1 p (9 per cent) a PD; of the 10 p in PR or SD, 4 had a relapse of the disease within 3-6 mo. Only 2 p (18 per cent) died 4 and 5 mo, respectively, after the start of therapy; the other 9 are alive after a minimum of 2 mo and a max of 15 mo. All of the p have complained of gastrointestinal disorders, however no signs of neurotoxicity due to metronidazole have been reported. We believe that such encouraging results, although preliminary, should be attributed to the combination of polychemotherapy with radiotherapy potentiated by radiosensitization. (no Refs) (In ITA)

43. RADIOTHERAPY IN THE MANAGEMENT OF FAR-ADVANCED CUTANEOUS MALIGNANCIES.

Cooper JS
Div. Radiation Oncology, New York Univ. Medical Center, 566 First Ave., New York, NY, 10016
J Dermatol Surg Oncol; 7(8):651-653 1981

The successful use of radiotherapy for the treatment of far-advanced cutaneous malignancies is described. Cases of two patients, a 68-yr-old man with numerous ulcerated lesions, including a large, 10 x 15 cm lesion on the left shoulder and a 3 x 4 cm lesion on the left leg, and a 72-yr-old man with a large epithelial malignancy on the left shoulder, are presented. The first patient received 3,000 rads in 10 fractions over 2 wk and the lesion was surgically debrided regularly, as was the leg lesion and another that developed on the penis. The second patient received 3,600 rads in fractions of 600 rads 2 x/wk. (1 Ref)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

44. SMALL CELL BRONCHOGENIC CARCINOMA: A REVIEW OF THERAPEUTIC RESULTS.

Bunn PA, Ihde DC
NCI-Veterans Admin. Medical Oncology Branch., Div. Cancer Treatment NCI, Veterans Admin. Medical Center, Washington, DC, 20422
Cancer Treat Res; 1:169-208 1981

Reports of chemotherapy (CT) trials, alone or in combination with surgery or radiotherapy (RT), in patients with small cell bronchogenic carcinoma are reviewed. The specific topics discussed are CT as surgical adjuvant treatment, randomized trials of RT alone vs CT alone, RT vs RT plus CT, single-agent CT, combination CT, and combined modality therapy (CT plus RT). Survival data are presented for patients treated in both randomized and nonrandomized trials of the combined modality approaches. Other subjects discussed are the dose, schedule, and timing of RT with CT, toxicities encountered in combined modality treatment, combined modality therapy with irradiation to extrahepatic sites, prophylactic cranial irradiation, and future therapeutic projects. (114 Refs)

45. THE USE OF PRE-OPERATIVE RADIATION THERAPY IN THE TREATMENT OF LUNG CARCINOMA.

Sherman DM, Weichselbaum RR
Dept. Radiation Oncology, St. Vincent Hosp., Worcester, MA, 01604
Cancer Treat Res; 1:63-73 1981

Large-scale randomized studies of preoperative radiation in lung cancer patients have shown no advantages over surgery alone in terms of survival or postoperative complications. However, preoperative radiation is indicated for patients with superior sulcus (SS) tumors and for selected patients with advanced marginally resectable lesions. The SS tumors are usually low-grade epidermoid carcinomas that grow slowly and metastasize late. Preoperative radiotherapy in patients with these tumors has resulted in a superior survival, compared with surgery or radiation alone. Among 38 patients with resectable, localized Stage III tumors, there were 12 survivors (median survival, 48 mo); most of these long-ter m survivors had epidermoid carcinoma, and all but 1 had undergone a pneumonectomy rather than a lobectomy. Postoperative radiation is indicated for patients with resected tumors and positive hilar or mediastinal nodes. (28 Refs)

46. THE ROLE OF RADIATION THERAPY IN THE TREATMENT OF REGIONAL NON-SMALL(OAT)-CELL CARCINOMA OF THE LUNG.

White JE, Boles M
Clinical Div., Dept. Therapeutic Radiology, Henry Ford Hosp., Detroit, MI, 48202
Cancer Treat Res; 1:113-156 1981

The radiotherapy of operable and inoperable non-small cell lung carcinomas (squamous cell carcinoma, adenocarcinoma, undifferentiated large cell carcinoma) is discussed. The topics covered include pathologic considerations and prognostic variables, radiation biology (genetic and nongenetic damage, cytokinetics), and the advantages of megavoltage radiation over orthovoltage radiation. Treatment vol, time-dose relationships, split course vs continuous radiation, and measures to avoid serious radiation complications also are discussed. Clinical trials of radiotherapy combined with chemotherapy or immunotherapy for the control of inoperable regional cancer are summarized along with trials of prophylactic radiation for the control of brain metastases, and interstitial irradiation for the improved local control of regional lung cancer. Indications for palliative radiation therapy are noted. (127 Refs)

47. A CASE FOR PREPLANNED THORACIC AND PROPHYLACTIC WHOLE BRAIN RADIATION THERAPY IN LIMITED SMALL-CELL LUNG CANCER.

Eagan RT, Frytak S, Lee RE, Creagan ET, Ingle JN, Nichols WC
Mayo Clinic, Rochester, MN, 55901
Cancer Clin Trials; 4(3):261-266 1981

Thirty patients with previously untreated limited small-cell lung cancer were treated in a prospectively randomized trial comparing chemotherapy versus chemotherapy plus prophylactic whole brain radiation therapy. Without preplanned thoracic radiation therapy in addition to the chemotherapy, 78% of patients failed in the lung (52% in the lung solely) as the first site of treatment failure. In those patients not receiving prophylactic whole brain irradiation, 73% failed in the CNS at the time of first and second failure versus 13% of the group randomized to prophylactic whole brain radiation therapy (and those 2 before the radiation was given). A strong case can be made for the use of both preplanned thoracic and prophylactic whole brain radiation therapy in conjunction with combination chemotherapy, at least until much more effective chemotherapy is found. (Author abstract) (9 Refs)

48. MESOTHELIOMA - THE ROLE FOR RADIATION THERAPY.

Brady LW
The Hahnemann Medical Coll. and Hosp. of Philadelphia, Two-thirty North Broad St., Philadelphia, PA, 19102
Semin Oncol; 8(3):329-334 1981

Experience with radiotherapy and its potential role in the overall management of patients with mesothelioma are reviewed. Pleural mesothelioma has been treated by surgery, radiation therapy, radioactive colloidal compound instillation, or combinations of radiation and chemotherapy and radiation, surgery, and chemotherapy. The role of surgery for cure is unclear, while palliative surgery might improve the quality of life by limiting the reaccumulation of pleural fluid or by the relief of pain. The entire hemithorax can be treated with a significant dose of radiation if vital normal tissues are shielded producing a definite objective response of the tumor and long-term control. Radioactive colloidal compound instillation is best used when the disease is still in the stage of small nodules with a predominance of pleural effusion. Doxorubicin appears to be the most promising chemotherapeutic agent for use with radiation therapy. A tolerable surgical procedure may be used to reduce the bulk of tumor allowing for a smaller dose of radiotherapy to achieve local control. Chemotherapy can then be used to treat residual disease. Treatment of primary mesothelioma of the peritoneum might include surgery to establish the diagnosis, followed by ip placement of radioactive colloid and abdominal radiotherapy. Intermittent combined chemotherapy would be used for long-term management of the disease. (42 Refs)

INSTRUMENTATION AND TECHNOLOGY

49. PHASE I AND PHASE II TRIALS OF THE USE OF LOCALIZED RADIOFREQUENCY HYPERTHERMIA IN 49 CASES OF DEEP-SEATED CANCER.

Israel L, Besenval M
Service d' Oncologie, CHU Avicenne, 125, route de Stalingrad, F 93009 Bobigny, France
Bull Cancer (Paris); 68(3):296 1981

Forty-nine patients with advanced thoracic and abdominal tumors were treated with progressive amounts of localized radiofrequency hyperthermia in an attempt to verify the total absence of toxicity of this treatment. The duration of hyperthermia was increased from 45 min to 3 hr and the frequency of administration was increased from 2 to 7 x per wk. The total period of hyperthermia production ranged from 4 hr 30 min to 54 hr. An objective response of greater than 50% was observed in 15/49 patients. Sixteen stabalizations of greater than 2 mo with immediate improvement in pain and 18 failures were also reported. The results indicated that localized radiofrequency hyperthermia is a useful treatment for the management of advanced tumors. (no Refs) (In FRE)

50. SURVIVAL OF MURINE EPITHELIOMA CELLS EXPOSED AT VARIOUS POSITIONS TO PIONS PRODUCED BY THE CYCLOTRON AT TRIUMF.

Sakamoto K, Takai Y, Lam GK
Dept. Radiation Biophysics, Faculty Medicine, Univ. Tokyo, Hongo, Bunkyo-ku, Tokyo, 113, Japan
Radiat Res; 87(1):159-165 1981

Male and female mice of the strain WHT/Ht were used as tumor hosts to study the effect of varying the depth and dose of pi-meson (pion) radiation on the survival rate of transplantable keratinizing squamous carcinoma cells. Tumors were exposed to pion radiation at four depths along the particle beam corresponding to plateau I region (6.0 cm), proximal peak (11.0 cm), distal peak (14 cm), and plateau II 21 cm) of the depth-dose distribution. The dose rate of pions was 0.15-0.20 Gray/min. The survival rate of the tumor cells was measured using 50% toxic dose assay. Anoxic cells were used to determine the oxygen enhancement ratio (OER) of pions. The relative biological effectiveness (RBE) compared with 250 kilovolt (kV) x-rays was calculated to be 1.3 +-0.2 for oxic cells and 1.5 +-0.3 for hypoxic cells at the proximal peak. The RBE at the distal peak was 1.6 +-0.3 for oxic and 2.1 +-0.5 for hypoxic cells. The OER for pions at the proximal peak was 2.0 +-0.4. The OER for 250 kV x-rays was 2.4 +-0.4. This value seems to decrease towards the distal peak. (17 Refs)

51. REPAIR IN MOUSE LUNG AFTER SPLIT DOSES OF X RAYS.

Travis EL, Down JD
Radiation Oncology Branch, NIH, Building 10, B3B38, Bethesda, MD, 20205
Radiat Res; 87(1):166-174 1981

What has been termed 'slow repair' was studied in mouse lung tissue. In two experiments the lungs of male mice of strain CBA/Ht were exposed either to varying single doses of x-ray or to equal split doses with an interval of 1 or 28 days. In a third experiment CBA/HtfBV mice were used. Constant doses were given at intervals of 1, 7, or 28 days. In each experiment 8 mice were exposed to single doses as controls. Lung damage was assessed by measuring breathing rates at 2-wk intervals from 12-28 wk after irradiation. Lung repair values were calculated. Results indicated that additional lung repair occurred as the interval between doses was increased from 1 to 28 days. The increase in repair was relatively constant. The median survival rate was doubled as the interval increased from 1 to 7 days (18 wk and 34 wk, respectively). Increasing the interval to 28 days added only 7 more wk to this. Up to 28 wk damage was primarily due to radiation pneumonitis (early damage). After 36 wk it was primarily due to fibrosis (late damage). It was concluded that early damage does not predict for late damage under all conditions. 'Slow repair' does occur. Early and late damage occurs as the interval between doses is increased. (19 Refs)

52. RADIOSENSITIZATION OF HYPOXIC MAMMALIAN CELLS IN VITRO BY SOME 5-SUBSTITUTED-4-NITROIMIDAZOLES.

Adams GE, Fielden EM, Hardy C, Millar BC, Stratford IJ, Widiamson C
Radiobiology Unit, Physics Dept., Inst. Cancer Res., Clifton Ave., Sutton, Surrey SM2 5PX, England
Int J Radiat Biol; 40(2):153-161 1981

The efficiencies of various 5-substituted-4-nitroimidazoles as radiation sensitizers have been determined in hypoxic Chinese hamster cells irradiated in vitro. Compared with published data on the sensitizing properties of substituted 2-nitro- and 5-nitroimidazoles, some of the 4-nitro derivatives show unusually high sensitizing efficiencies defined as the concentrations required to give an enhancement ratio of 1.6. The equilibrium one-electron reduction potentials of the compounds (E(1)7) were measured by a pulse radiolysis technique and the results show that although sensitizing efficiencies are unexpectedly high, based on considerations of electron affinity, they still increase with increasing values of E(1)7. Enhancement ratios were determined in two V79 cell lines for combinations of one of these compounds (a 4-nitroimidazole containing the group SO2.O.phenyl in the 5-position, NSC 38087) with various concentrations of misonidazole. The sensitization observed suggests that the two compounds may be operating by different mechanisms. (Author abstract) (10 Refs)

53. CYTOTOXIC PROPERTIES OF A 4-NITROIMIDAZOLE (NSC 38087): A RADIOSENSITIZER OF HYPOXIC CELLS IN VITRO.

Stratford IJ, Williamson C, Hardy C
Physics Dept., Inst. Cancer Res., Sutton, Surrey SM2 5PX, England
Br J Cancer; 44(1):109-116 1981

The compound 5-phenoxysulphonyl-1-methyl-4-nitroimidazole (NSC 38087) can act as a sensitizer of hypoxic mammalian cells to radiation in vitro. The degree of sensitization achieved is greater than would be predicted from the drug's electron affinity. Cytotoxicity studies have shown that 5 uM NSC 38087 can reduce the surviving fraction of log-phase V79 cells in air at 37 C to 10(-2) after 2 hr exposure. This toxicity is considerably increased by small rises in temperature. In contrast to other nitroheterocyclic radiosensitizers, NSC 38087 and related 5-substituted 4-nitroimidazoles show greater toxicity towards aerobic than hypoxic cells. Log-phase cells show the highest sensitivity to the toxic action of NSC 38087, with plateau-phase cells, cells with a history of chronic hypoxia, and thermotolerant cells showing greater resistance. These toxicity data are compared to those for the 2-nitroimidazole hypoxic-cell sensitizer misonidazole. (Author abstract) (34 Refs)

54. MISONIDAZOLE ENHANCEMENT OF RADIATION-INDUCED GROWTH DELAY IN RAT RHABDOMYOSARCOMA TUMOURS EXPOSED TO ACCELERATED CARBON AND NEON IONS.

Tenforde TS, Curtis SB, Tenforde SD, Parr SS, Crabtree KE, Flynn MJ, Howard J, Lyman JT
Biology and Medicine Div., Lawrence Berkeley Lab., Univ. California, Berkeley, CA, 94720
Int J Radiat Biol; 40(2):117-129 1981

The response of a rat rhabdomyosarcoma tumor was assessed by measurements of radiation-induced growth delay resulting from administration of the hypoxic cell sensitizer misonidazole in combination with single and fractionated doses of x-rays and charged-particle radiation. Enhancement ratios of 1.8-

2.1 were obtained following single doses of misonidazole (500 mg/kg ip) and 225 kV x-rays. Single doses of misonidazole with either carbon-ion or neon-ion radiation in the 4 cm extended-peak ionization region led to enhancement ratios of 1.2-1.3. When combined misonidazole (300 mg/kg ip) and x-ray treatments were given in four daily fractions, the enhancement ratios decreased to 1.2-1.5. However, a four-fraction schedule using either carbon-ion or neon-ion radiation in combination with misonidazole gave enhancement ratios of 1.1-1.3, which are similar to the values obtained for single-dose schedules with the sensitizer and charged-particle radiation. (Author abstract) (37 Refs)

55. COMPARISON OF HYPERBARIC OXYGEN AND MISONIDAZOLE IN FRACTIONATED IRRADIATION OF MURINE TUMORS.

Suit HD, Maimonis P, Michaels HB, Sedlacek R

Edwin L. Steele Lab. Radiation Biology, Dept. Radiation Medicine, Massachusetts General Hosp., Harvard Medical Sch., Boston, MA, 02114

Radiat Res; 87(2):360-367 1981

The enhancement ratios for hyperbaric oxygen and for misonidazole were determined using two transplanted syngeneic tumors (spontaneous mammary carcinoma and squamous cell carcinoma) in C3Hf/Sed mice, and the acute response of C3H mouse skin as the endpoints. Animals were irradiated when tumors reached 6-8 mm in size or 18 days after plucking hair of the right-leg thigh of tumor-free mice. Calculation of the radiation dose (which produced a local control of 50% of tumors) showed essentially the same enhancement ratios (1.45-1.55) for hyperbaric oxygen and misonidazole (0.3 mg/kg, ip). The response of normal mouse skin to radiation given in five equal doses indicated slightly greater enhancement ratio for hyperbaric oxygen (1.94) than for misonidazole (1.54). (26 Refs)

56. SEARCH FOR RADIOPROTECTIVE COMPOUNDS. PART XIX. PROTECTION PROVIDED TO MICE BY ORAL ADMINISTRATION OF LIPID- AND WATER-SOLUBLE COMPOUNDS.

Grant GA, Leach KE

Defence Res. Establishment, Ottawa, Ontario, Canada

Search for Radioprotective Compounds. Part XIX. Protection Provided to Mice by Oral Administration of Lipid- and Water-Soluble Compounds. Available from National Technical Information Service, Springfield, VA, as AD-A095 715/9:, 63 pp., 1981.

Forty-two compounds previously screened at the Walter Reed Army Institute of Research were selected for further evaluation. The compounds were administered po to mice prior to gamma irradiation. The LD LD(50/30) was computed and dose reduction factors determined. Dose radiation factors up to 1.45 were obtained for both water- and lipid-soluble compounds with administered oral doses of 100 mg/kg or less. The relationship between chemical structure and protective activity of the compounds is discussed. (Author abstract)

57. THE IMPORTANCE OF INTRATUMOR TEMPERATURE UNIFORMITY IN THE STUDY OF RADIOSENSITIZING EFFECTS OF HYPERTHERMIA IN VIVO.

Gibbs FA, Peck JW, Dethlefsen LA

Div. Radiation Oncology, Univ. Utah Medical Center, Salt Lake City, UT, 84123

Radiat Res; 87(1):187-197 1981

A technique for water bath heating of murine tumors was tested. Equal numbers of male and female C3H mice weighing 20 to 25 g were implanted sc with C3H mammary tumors inserted into the flank. The tumors were allowed to grow to 7 to 9 mm. Three groups of mice were treated. The first received x-ray treatment alone. The second received x-ray treatment combined with conventional water bath heating. The third group received x-ray treatment combined with water bath heating involving an aluminum clip. The clip was designed to expose a greater tumor area to the water bath, allowing for a more uniform temperature throughout the tumor. Xenon-133 clearance studies indicated that the clip had no effect on blood flow to the tumor. Temperatures throughout tumors with the clip were found to be more uniform than in tumors without the clip. The clip resulted in a TCD50/120 significantly lower than those for the other two groups. As a result the thermal enhancement ratio with the clip was higher (1.9) than that without it (1.5). The results show that conventional heating methods overestimate the TCD50/120. By implication, the effects of heat treatment are underestimated. (10 Refs)

58. TEMPERATURE AND SEQUENCE IN THERMORADIOTHERAPY. EXPERIMENTAL RESULTS IN MICE.

Arcangeli G, Cividalli A, De Vita R, Lovisolo G, Mauro F, Pardini MC

Istituto Medico e di Ricerca Scientifica, Via L. Bodio 58, I 00191 Rome, Italy

Bull Cancer (Paris); 68(3):232-239 1981

Experimental results in mice demonstrated that simultaneous application of irradiation and heat at 42.5 C results in effects of radiation (TER's) of similar extent in both tumor and normal tissue, and therefore no therapeutic gain. Applying heat at the same temperature 4 hr after radiation, each course being given at an interval of 72 hr, induces TER's lower in comparison with simultaneous treatments, but still higher in tumors than in the skin, so that an appreciable therapeutic gain can be obtained. Producing hyperthermia of 45 C in mice, by means of an interstitial heating technique, gave similar responses in tumors treated with either simultaneous or sequential schedules. A tumor reduction below palpable size was obtained with a 3-course schedule in the case of both combined treatment and hyperthermia alone. In large tumors, hyperthermia alone induced only a slight reduction in growth rate, while with radiotherapy alone (3 x 10 Gy) similar responses were observed in both small and large tumors. Even in these large tumors, growth rate reduction induced by both simultaneous and sequential treatment (3 x 12 Gy) appeared to be similar, though markedly shorter than that obtained in small tumors. Our results suggest that the response to thermora diotherapy could be due to an essentially additive effect, and that, at temperatures of 4 C or above, the antineoplastic response could be more strictly related to the cytodestructive effect of heat per se rather than its radiosensitizing effect. Using the interstitial heating technique, no increased radiation reactions have been observed, but only reactions similar to those obtained in animals treated with hyperthermia alone. All these experimental data

suggest that each type of treatment at temperatures of 45 C or above, or simultaneous treatment at lower temperatures, can be clinically feasible only in situations where tumors can be heated selectively or preferentially in relation to surrounding normal tissues. In other situations, heat at 42-43 C, delivered 4 hr after irradiation, should be employed to avoid abnormal reaction in normal tissue. (Author abstract) (12 Refs) (In FRE)

59. FRACTIONATED RADIATION AND HYPERTHERMIA: EXPERIMENTAL AND CLINICAL STUDIES.

Overgaard J
Radiumstationen, Inst. Cancer Res., 44 Norrebrogade, DK-8000 Aarhus C., Denmark
Cancer; 48(5):1116-1123 1981

The effect of fractionated radiation and hyperthermia was experimentally studied in a C3H mammary carcinoma and its surrounding skin. Simultaneous radiation and heat (42.5 C -60 min) with one or five fractions gave thermal enhancement ratios (TER) of approx 2.5 in both tumor and surrounding skin, and no improved therapeutic effect was obtained. Five fractions of sequential treatment with heating 4 hr after radiation reduced the tumor TER to about 1.4, but when 72 were allowed between the fractions, no thermal enhancement of the skin was observed. Thus, an improved therapeutic ratio was observed. Clinically, the combined treatment was studied in 12 patients with 49 metastases from malignant melanoma treated with different schedules of radiation and hyperthermia (approx 43 C for 30 min). Simultaneous treatment with three fractions in 8 days gave TER values in the skin between 1.2-1.4, but a similar effect was found in the tumor. Three fractions of sequential treatment in 8 days did not produce any thermal enhancement of the skin response, but still presented an apparent gain of the tumor response, and so seemed to increase the therapeutic effect. Based on these findings, the strategy for further clinical use of combined hyperthermia and radiation is discussed. (Author abstract) (32 Refs)

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Radiation Therapy

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service • National Institutes of Health • National Cancer Institute

HE 20. 3173/2:

BREAST NEOPLASMS

1. USE OF VARIABLE THICKNESS BOLUS TO CONTROL ELECTRON BEAM PENETRATION IN CHEST WALL IRRADIATION.

Archambeau JO, Forell B, Doria R, Findley DO, Jurisch R, Jackson R
Div. Radiation Oncology, City of Hope Natl. Medical Center, 1500 East Duarte Road, Duarte, CA, 91010
Int J Radiat Oncol Biol Phys; 7(6):835-842 1981

Design and construction of a variable thickness bolus (VTB) to control beam penetration in chest-wall electron radiation therapy are described. The technique was used in 18 patients irradiated for recurrent or residual breast carcinoma or for suspected microscopic disease. The target vol was large in all patients, requiring extended field irradiation of the chest wall, axillary, supraclavicular, and mediastinal regions. A VTB that controlled depth of penetration of the 80% isodose line to a designated tissue plane was customized for each patient. All patients tolerated the 5,000-5,600 rad delivered to the skin and the 4,000-4,500 rad delivered at depth in 6 wk. Residual disease received 6,000-6,500 rad delivered through small fields or with local Iridium-192 implant. Lymphopenia occurred in all patients by the end of therapy, and skin changes (eg, atrophy, telangiectasia) were observed in the patients followed for 5-20 mo. Chest x-ray revealed no fibrotic change in lungs underlying the radiation field. The pattern of response resembled that following photon therapy. (14 Refs)

2. LONG-TERM EFFECT OF POSTOPERATIVE IRRADIATION ON THE IMMUNE FUNCTIONS IN PATIENTS WITH MAMMARY CARCINOMA.

Toivanen A, Nordman E
Dept. Medicine, Medical Microbiology and Radiation Therapy, Univ. Turku, SF-20520 Turku, Finland
Acta Radiol Oncol Radiat Phys Biol; 20(2):119-124 1981

The effect of postoperative irradiation on the immune functions of 13 patients with breast carcinoma is reported, using as parameters the peripheral blood lymphocyte count, percentages of E and EAC rosette forming cells, and lymphocyte proliferative responses to PHA, Con A and PPD. After irradiation the number of peripheral blood lymphocytes was reduced during 8 mo. The percentages of E and EAC rosette forming cells were not altered during the observation time of 7 to 36 mo. In the proliferative responses of lymphocytes to PHA, Con A and PPD, the postoperative irradiation caused a decrease which, regarding PHA and Con A, lasted up to 8 mo and then recovered. The decrease in the proliferative responses to PPD was stronger and lasted during the whole observation time. In the mitogenic responses of patients with recurrent or disseminating disease no difference could be demonstrated as compared with the patients living recurrence-free. (Author abstract) (24 Refs)

3. REVERSIBLE BRACHIAL PLEXOPATHY FOLLOWING PRIMARY RADIATION THERAPY FOR BREAST CANCER.

Salner AL, Botnick LE, Herzog AG, Goldstein MA, Harris JR, Levene MB, Hellman S
Joint Center for Radiation Therapy, Harvard Medical Sch., 50 Binney St., Boston, MA, 02115
Cancer Treat Rep; 65(9):797-802 1981

Reversible brachial plexopathy has occurred in very low incidence in patients with breast carcinoma treated definitively with radiation therapy. Of 565 patients treated between January 1968 and December 1979 with moderate doses of supervoltage radiation therapy (av axillary dose of 5,000 rad in 5 wk), 8 patients (1.4%) developed the characteristic symptoms at a median time of 4.5 mo after radiation therapy. This syndrome consists of paresthesias in all patients, with weakness and pain less commonly seen. The symptom complex differs from other previously described brachial plexus syndromes, including paralytic brachial neuritis, radiation-induced injury, and carcinoma. A possible relationship to adjuvant chemotherapy exists, though the etiology is not well-understood. The cases described demonstrate temporal clustering. Resolution is always seen. (Author abstract) (26 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

4. RESULTS OF RADIATION TREATMENT OF CEREBELLAR MEDULLOBLASTOMA.

Chin HW, Maruyama Y
Radiation Medicine, Univ. Kentucky Medical Center, 800 Rose St., Lexington, KY, 40536
Int J Radiat Oncol Biol Phys; 7(6):737-742 1981

Survival data are reported for 20 patients (12 male and 8 female, age 1.5-31 yr, median 8 yr) who were treated with megavoltage Cobalt-60 radiation following cranial surgery for medulloblastoma. The radiation treatment involved parallel opposed bilateral ports to whole brain and upper cervical cord, followed by boost irradiation to the posterior fossa with reduced lateral fields. Spinal cord irradiation was delivered to the whole spinal axis with matching posterior fields. Overall 5-yr survival rates were 44% for the entire group, 80% for patients receiving greater than 5,000 rad, and 15% for those receiving less than 5,000 rad. Age was not a significant factor in survival, but female patients exhibited better survival. Treatment failures were due mainly to local recurrence: 78% of the recurrences were in the low-dose group. None of the five patients who underwent shunting procedures for hydrocephalus survived 5 yr. Current Karnofsky performance status of the surviving patients is greater than 90%. Doses of 5,000-5,500 rad appear to lead to long term survival, tumor cure, and high performance results. (24 Refs)

5. MYELOGRAPHY AND CYTOLOGY IN THE TREATMENT OF MEDULLOBLASTOMA.

Deutsch M, Reigel DH
Joint Radiation Oncology Center, 3601 Fifth Ave., Pittsburgh, PA, 15213
Int J Radiat Oncol Biol Phys; 7(6):721-725 1981

Postoperative myelograms revealed asymptomatic spinal cord involvement in 8/22 children with newly diagnosed medulloblastoma. Two additional patients with recurrence in the posterior fossa also had cord lesions detectable by myelography. Cerebral spinal fluid (CSF) cytology findings were inaccurate in predicting cord involvement: presence of malignant cells in the CSF varied according to sampling site and time relative to posterior fossa surgery. All children with newly diagnosed tumors were treated with radiotherapy to the entire cranial-spinal axis (minimum 3,000 rad/20 treatments) and posterior fossa (5,000-5,400 rad); demonstrable spinal cord lesions were boosted to a total dose of 3,900-4,500 rad. The two children with recurrent tumors were treated with radiotherapy and/or chemotherapy, but died within 4 mo of relapse. Of the

19 children followed greater than 1 yr post-diagnosis, 7 relapsed 9-69 mo after the completion of radiotherapy. Three had initial spinal cord involvement and also cord involvement at the time of intracranial recurrence. The frontal lobe was the site of recurrence in three patients. Computed tomography scans resulted in early detection of intracranial recurrence in three patients. All were retreated with radiotherapy in conjunction with misonidazole and subsequent chemotherapy; they are alive and clinically disease-free 10, 18, and 19 mo after relapse. (3 Refs)

6. RADIO- AND CHEMOTHERAPY OF MALIGNANT GLIOMAS. PATHOLOGICAL CHANGES IN THE NORMAL NERVOUS TISSUE.

Schiffer D, Giordana MT, Soffietti R, Tarenzi L, Milani R, Vasario E, Paoletti P

Neurological Clinic, Univ. Torino, Torino, Italy

Acta Neurochir (Wien); 58(1/2):37-58 1981

The pathological effects of radio- and chemotherapy on the normal nervous tissue have been studied in 42 brains with malignant gliomas. The brains have been examined by means of the complete study technique. In seven cases the picture of delayed radionecrosis has been found. Apart from this, many histological features have been related to postoperative survival, radiation dose, interval between radiation and death, chemotherapy, steroids, size and activity of the tumor. Some alterations, such as peritumoral necroses, macrophage areas, vessel wall degenerations etc result from radiotherapy. The relations and pathogenesis are discussed. (Author abstract) (35 Refs)

7. THE PALLIATION OF BRAIN METASTASES IN A FAVORABLE PATIENT POPULATION: A RANDOMIZED CLINICAL TRIAL BY THE RADIATION THERAPY ONCOLOGY GROUP.

Kurtz JM, Gelber R, Brady LW, Carella RJ, Cooper JS

Dept. Radiation Oncology, Sch. Medicine and Univ. Hosp., Seattle, WA, 98195

Int J Radiat Oncol Biol Phys; 7(7):891-895 1981

A series of 255 patients with positive isotope brain scans and no evidence of other disseminated disease were randomized into two groups to compare the palliative efficacy of a short, intensive course of brain irradiation (3,000 rad in 2 wk; 130 patients) with that of a high-dose course (5,000 rad in 4 wk; 125 patients). Excluded were patients who had received anticancer treatment within the previous 2 wk, had a progressive untreated primary, or were of Class IV in neurologic function (NF). Thirty-five patients (9/130 and 24/125, respectively) failed to complete the protocol treatment, 24 because of deterioration or death. There was no difference between the two treatments with respect to altering the pattern of cause of death; 107 in each group have died. The only marked difference in palliation was that 41% of NF Class II and 71% of NF Class III patients improved in neurologic function during treatment, with no difference in rate of improvement between the two treatment arms. These results indicate that the treatment of choice for the great majority of patients with metastatic cancer to the brain is a short course of 2,000-3,000 rad. (14 Refs)

8. THE RELATIVE EFFECTIVENESS OF RADIATION THERAPY, CORTICOSTEROIDS, AND SURGERY IN THE MANAGEMENT OF MELANOMA METASTATIC TO THE CNS SYSTEM.

Katz HR

Dept. Radiotherapy, American Oncologic Hosp., Central and Sheimire Streets, Philadelphia, PA, 19104

Int J Radiat Oncol Biol Phys; 7(7):897-906 1981

Various treatment modalities were studied retrospectively in patients with melanoma metastatic to the CNS. Among the 63 patients, 25 had multiple brain metastases (MBM) and 38 solitary brain metastases (SBM). The 41 males and 22 females ranged in age from 18-78 yr. Various antineoplastic agents were employed. Corticosteroids were given to 49 patients 2-7 days before radiation therapy (RT); 73% showed documented response to the agents, which was substantially higher than the 42% response rate to RT. RT led to response in 52% with SBM and 30% with MBM. Large doses (500 rad or greater per fraction) produced significa5tly greater response than smaller doses, although fraction size had no effect on duration of response or survival. Surgical excision of SBM with RT had significantly longer av response (405 days vs 57 days) and survival (448 days vs 96 days) than did SBM who did not receive surgery. Second RT courses relieved recurrent neurological symptoms, but responses were short and without influence on survival. Four of seven patients with cord compression who underwent decompressive laminectomy showed neurological improvement; postoperative RT led to no further improvement. Two patients with cord compression who were paraplegic did not response to RT. Surgical excision with postoperative RT is recommended for management of SBM from melanoma. (34 Refs)

9. QUALITY OF LONG-TERM SURVIVAL FOLLOWING IRRADIATION FOR INTRACRANIAL TUMORS IN CHILDREN UNDER THE AGE OF TWO.

Spunberg JJ, Chang CH, Goldman M, Auricchio E, Bell JJ

Dept. Radiation Therapy, Albert Einstein Medical Center, York and Tabor Roads, Philadelphia, PA, 19141

Int J Radiat Oncol Biol Phys; 7(6):727-736 1981

Survival rates, quality of survival, and late radiation sequelae were studied retrospectively in 38 patients who received CNS irradiation alone or postoperatively for primary intracranial tumors at age 3-24 mo. The children included 21 females and 17 males. Twenty-four deaths were attributable to the primary disease or its complications. The 5-, 10-, and 15-yr absolute survival rates were 50%, 39%, and 38%, respectively. Posterior fossa tumors had the best prognosis. The 14 patients who are still alive have a mean survival of 12.9 yr (range 5-20 yr). Four of these patients had late recurrence of the primary tumor requiring additional radiotherapy and/or surgery. Of the long-term survivors, 8 have minimal or no neurologic deficits, 11 are within the educable range on formal intelligence tests, and 12 have a Karnofsky performance score of 70 or greater. Clinical evidence of endocrinologic dysfunction is limited to growth retardation in three children who received doses greater than 3,600 rad to the hypothalamic-pituitary region. On a 'Composite Quality of Survival Scale,' graded 1 to 5, eight patients rated grade 3 or better, with three patients essentially normal. The data indicated that children less than 2 yr tolerate cranial radiotherapy better than previously believed; however, further optimization of radiotherapy factors (dose, time, vol) is essential to minimize the potential late effects of CNS radiation. (63 Refs)

10. CT OF THE ADVERSE EFFECTS OF THERAPEUTIC RADIATION OF THE CENTRAL NERVOUS SYSTEM.

Kingsley DP, Kendall BE
Dept. Radiology, London Hosp., Whitechapal, London E1 1BB, England
AJNR; 2(5):453-460 1981

The computed tomographic features of radiation damage to the CNS as a result of radiation therapy were investigated. One child with acute lymphatic leukemia developed somnolence syndrome that was temporary. Permanent complications were more frequent, and included eight patients with histologically proven radionecrosis and one who developed a meningioma in the radiotherapy field, 13 who developed atrophy, three children who developed calcification of the basal ganglia, one necrotizing leukoencephalopathy, three with mineralizing microangiopathy, infarction due to radiation-induced vascular occlusion, abscess formation, and an acute agonal hemorrhage into areas of histologically proven radionecrosis. The most frequent early CT change of radiation damage is low attenuation in the white matter, which might be misinterpreted as due to tumor progression. The importance of appreciating the CT changes in these conditions and recognizing their significance is emphasized. (39 Refs)

DIGESTIVE NEOPLASMS

11. MANAGEMENT OF CARCINOMA OF ANAL CANAL.

Schneider TC, Schulte WJ
Dept. Surgery, Wood Veterans Admin. Medical Center, Medical Coll. Wisconsin, Milwaukee, WI, 53193
Surgery; 90(4):729-734 1981

The application of various treatment modalities in the management of carcinoma of the anal canal remains controversial. Forty-nine patients were reviewed from the affiliated hospitals of the Medical College of Wisconsin. Exclusions for postoperative deaths, associated vulvar carcinoma, and lack of follow-up left 35 patients for determinate study. The overall 5-yr survival rate was 28.6% (10 of 35). When reviewed by stage of disease, a direct relationship between advanced stage and decreased survival (ie, 60% 5-yr survival rate with Stage I, 25% with Stage II, and 14.3% with Stage III) was noted. Further re classification of Stage III, nodal involvement, showed the same survival for perirectal nodal involvement as for synchronous inguinal node involvement. Seven of 10 5-yr survivors received a combined surgery-radiotherapy approach. In addition, in those patients receiving tumoricidal radiation pre- or postoperatively, no local recurrence was demonstrated. A treatment protocol of abdominal perineal resection, with combined radiation therapy for locally advanced lesions, is proposed. (Author abstract) (24 Refs)

12. SINGLE HIGH DOSE INTRAOPERATIVE ELECTRONS FOR ADVANCED STAGE PANCREATIC CANCER: PHASE I PILOT STUDY.

Goldson AL, Ashaveri E, Espinoza MC, Roux V, Cornwell E, Rayford L, McLaren M, Nibhanupud R, Mahan A, Taylor HF, Hemphil N, Pearson O
Dept. Radiotherapy, Howard Univ. Hosp., Washington, DC, 20060
Int J Radiat Oncol Biol Phys; 7(7):869-874 1981

Phase I toxicity studies were undertaken with intraoperative radiotherapy (IOR) for unresectable or partially resectable neoplasms of various body cavities and sc soft tissues. Nineteen patients (12 men, 7 women; ages 52-89 yr) with advanced inoperable carcinoma of the pancreas received electron beams with energies of 9, 12, or 15 megaelectron volts, with 80% depth dose distributions of 3 cm, 4 cm, and 5 cm, respectively. There were no postoperative deaths within 30 days and no delayed wound healing. Only one patient developed an intraabdominal infection. Acute minor side effects were nausea, vomiting, and anorexia 1-5 days post-IOR, seen in 8/19 patients. At all doses and vol, transient, mild elevations in glucose and amylase were also seen. Serious acute side reactions occurred in three patients: one patient who died abruptly 6.5 mo post-IOR had a ruptured superior mesenteric artery and a small ulcer on the posterior wall of the duodenum; a second who died 3 mo post-IOR had liver metastases and an ulcer on the posterior wall of the stomach in the region of the original tumor; a third who died suddenly 3 mo post-IOR had stricture of the common bile duct. Autopsies were performed in these 3 patients and in 2 others among 17 who died revealed massive tumor necrosis with a mild fibrous reaction and islands of viable cancer cells. Two patients are alive 5 and 12 mo post-IOR, respectively; median survival among the 19 patients was 5.5 mo. The palliative and curative values of IOR are difficult to determine from this series. Recommendations about optimal dose are given. (15 Refs)

GENITOURINARY NEOPLASMS

13. UPDATE ON INTRACAVITARY RADIATION IN THE TREATMENT OF BLADDER TUMORS.

Hewitt CB, Babiszewski JF, Antunez AR
(c/o Babiszewski) Dept. Urology, Cleveland Clinic Foundation, 9500 Euclid Ave., Cleveland, OH, 44106
J Urol; 126(3):323-325 1981

A 15-yr experience with intracavitary radiation for the treatment of selected bl adder tumors is presented. The age range of these patients was 39 to 91 yr, with an av of 65 yr. There were 38 men and 17 women with multiple Stage A bladder tumors and carcinoma in situ. Some patients were poor risks for treatment by total extirpative surgery. A simplified technique using a 25 mg radium capsule as a central source is described for administration of 4,000 to 5,000 rad to the surface of the bladder. Most patients tolerate the presence of the radium catheter with little difficulty. No morbidity and no mortality were reported. In this series more than 60% of the patients benefited from the therapy, with no recurrence noted in some cases after up to 8-1/2 yr of followup. Intracavitary radiation is used in few clinics. Use of this modality does not preclude or complicate the subsequent use of other conservative measures or radical therapy if required. It is an effective procedure for treatment of multiple superficial and noninvasive tumors, including primary or recurrent carcinoma in situ, that are uncontrolled by other conservative measures. (Author abstract) (5 Refs)

14. EFFECT OF HEPATIC IRRADIATION ON THE TOXICITY AND PHARMACOKINETICS OF ADRIAMYCIN IN CHILDREN.

Holcenberg JS, Kun LE, Ring BJ, Evans WE
Dept. Pharmacology, Medical Coll. Wisconsin, P.O. Box 26509, Milwaukee, WI, 53226
Int J Radiat Oncol Biol Phys; 7(7):953-956 1981

The possibility of alterations in the pharmacokinetics and toxicity of adriamycin (AD) following radiotherapy was studied in 10 children (2-12 yr old) with unilateral Wilms' tumors. The treatment was surgical removal of kidney followed by AD (30 mg/square meter (m2) at 1, 4, and 8 wk and then every 4 wk to a total of 240-300 mg/m2) and vincristine (1.5 mg/m2 weekly for 6 doses and then every 2 wk for 23 doses). Radiation therapy was begun within 1 wk following the first dose of AD. The dose of irradiation to significant hepatic vol ranged from 2,400-2,700 rad at 100-150 rad/fraction. Liver function tests showed slight abnormalities during the treatment. The greatest elevation in serum transaminase and alkaline phosphatase usually occurred after the third or fourth dose of AD, 1-2 mo after the completion of radiation therapy. Transient leukopenia and mild nausea and vomiting occurred after most doses of AD. Two patients had a lower nadir of WBC count following the AD course during radiation therapy. In the other patients, these toxic manifestations were similar before, during, and after radiation therapy. No statistical difference was noted in the plasma anthracycline values before, during, or after hepatic irradiation. The results indicated that children receiving limited hepatic irradiation and 30 mg/m2 of AD did not have enhanced hepatic toxicity and showed no significant alteration in AD pharmacokinetics. (27 Refs)

15. INTERSTITIAL IRRADIATION OF CARCINOMA OF THE PROSTATE WITH 125IODINE AND SIMULTANEOUS EXTRAPERITONEAL PELVIC LYMPHADENECTOMY IN 32 PATIENTS: TRIALS, TRIBULATIONS AND POSSIBLE TRIUMPHS.

Whitehead ED, Hugh SH, Garcia RL, Rao R, Leiter E
Dept. Urology, Beth Israel Medical Center, New York, NY
J Urol; 126(3):366-371 1981

A series of 32 patients with carcinoma of the prostate who underwent 125iodine interstitial irradiation to the prostate and simultaneous extraperitoneal pelvic lymphadenectomy was reviewed. The patients were segregated into 3 groups: Group 1-patients with early localized low grade disease, Group 2-patients with advanced localized high grade disease and Group 3-patients with early localized high grade disease and those with advanced localized low grade disease. Owing to the high degree of predictability of the absence or presence of pelvic lymph node metastasis in patients in Groups 1 and 2 and the morbidity associated with superficial pelvic lymphadenectomy we do not advocate this procedure in these patients. However, we advocate pelvic lymphadenectomy in patients in Group 3 because of the unpredictability of lymph node metastasis. Furthermore, our data indicate that (1) the morbidity of the combined procedures is relatively low, with no patients becoming incontinent and only 12.5% becoming impotent, (2) 125iodine interstitial irradiation of the prostate after transurethral prostatectomy is safer in terms of postoperative complications than is radical prostatectomy and (3) while superficial pelvic lymphadenectomy is not an innocuous procedure it generally is safe and, at times, an important diagnostic staging procedure. (Author abstract) (24 Refs)

16. RADIATION THERAPY OF SEMINOMA OF THE TESTIS.

Qian TN, Hu YH, Chen CX, Qi YQ, Gu DZ, Gu XZ
Dept. Radiation Oncology, Cancer Inst. (Hosp.), Chinese Acad. Medical Sciences, Beijing, China
Int J Radiat Oncol Biol Phys; 7(6):717-720 1981

Survival and performance status (PS) data are reported for 73 men (age 21-60 yr) with testicular seminoma treated by orchiectomy followed by radiation (telecobalt therapy, 35 million electron volt beam, or 220 kilovolt x-ray). Routine irradiation included the retroperitoneal lymphatics up to the level of the diaphragm. Daily dose to the abdomen was 200 rad. The 5-yr survival rates were 100% for 54 Stage I patients and 92% for 13 Stage II patients; none of the 6 Stage III patients survived. A total of 49 Stage I and II patients survived 10 yr or more. The Karnofsky PS of 50 seminoma patients 5 yr after treatment was 90-100, ie, the patients were leading active, normal lives. Validity of treating metastatic seminomas by irradiation is illustrated by the case of a 49-yr-old patient with pulmonary metastases which did not respond to N-formylsarcolysin therapy but disappeared after telecobalt irradiation (total tissue dose 3,500 rad). (10 Refs)

GYNECOLOGIC NEOPLASMS

17. USEFULNESS OF TANDEM HYSTEROGRAPHY. TANDEM HYSTEROGRAPHY: A METHOD TO PREVENT LOCAL RECURRENCE AFTER RADICAL RADIOTHERAPY OF UTERINE CERVIX CANCER.

Miyazaki M
Dept. Radiology, Tokyo Women's Medical Coll., Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 41(6):527-538 1981

One of the causes of the local recurrence after radical radiotherapy of uterine cervix cancer is underdosage to the uterine fundus because of inadequate position of Tandem radiation sources. Until now, the dose distribution to the uterine corpus, especially to the uterine fundus has not been able to be revealed. From June 1976, tandem hysterography has been performed at the time of intracavitary irradiation for uterine cervix cancer in order to know the relationship between radiation sources and the uterine fundus. The dose distribution to the uterine fundus can be revealed by this method. From 131 patients, 236 tandem hysterographies were performed. In 145 tandem hysterographies, the relationship between the radiation sources and the uterine fundus is obtained. Twelve tandem hysterographies, performed for the patients with radical radiotherapy, show the inadequate position of the radiation sources. In 11 of the cases, the position of the radiation sources could be corrected and a cancerocidal dose was given to the uterine fundus. None of the patients with Stage I, II and IIIe has shown local recurrence. Perforation caused by Tandem applicator insertion can be easily known by using tandem hysterography. Tandem hysterography is a useful method to know the relationship between the radiation sources and the uterine fundus and to prevent the local recurrence after radical radiotherapy. (Author abstract) (16 Refs) (In JPN)

18. UTERINE SARCOMAS: AN ANALYSIS OF 69 PATIENTS.

Mantravadi RV, Bardawil WA, Lochman DJ, Liebner EJ, Townsend DE, Chao JH, Chaudhuri B

Univ. Illinois Hosp., P.O. Box 6998, Chicago, IL, 60680

Int J Radiat Oncol Biol Phys; 7(7):917-922 1981

In a review of 69 uterine sarcomas, histological types included 32 leiomyosarcomas (LMS), 10 endometrial stromal sarcomas (ESS), 5 rhabdomyosarcomas (RMS), 14 mixed mesodermal sarcomas (MMS), and 3 fibrosarcomas (FS). Staging by International Federation of Obstetrics and Gynecology standards indicated 29 stage I, 5 stage II, 11 stage III, 7 stage IV, and 17 unknown. Procedures employed included total abdominal hysterectomy and bilateral salpingooophorectomy in 54, surgery alone in 31, radiotherapy (RT) alone in 15 , preoperative RT and surgery in 5, and surgery followed by RT in 18. The overall survival rate was 50.7% after 2 yr and 37.9% after 5 yr. The 5-yr survival rate was 17/29 (58%) for Stage I, 2/5 (40%) for Stage II, and 0/11 for Stage III and 0/7 for Stage IV. At any given stage patients with LMS showed better survival rates than other histologic types. Combined treatment produced the lowest rate of pelvic failures. Distant metastases occurred in 73.3% of cases; common metastasis sites were lung and liver. Lung metastases occurred in all LMS patients showing failure. Adjuvant postoperative radiotherapy was recommended in LMS later than stage I and in all stages of other types. Systemic chemotherapy was also recommended as part of comprehensive treatment. (16 Refs)

HEAD AND NECK NEOPLASMS

19. CARCINOMA CF THE MAXILLARY ANTRUM: SURGERY OR RADIATION THERAPY.

Amendola BE, Eisert D, Hazra TA, King ER

Dept. Radiology, Radiation Therapy Div., University Hosp., Ann Arbor, MI, 48109

Int J Radiat Oncol Biol Phys; 7(6):743-746 1981

Results of surgery and radiation therapy were compared in a retrospective study of 39 patients (29 male and 10 female, age 32-81 yr) treated for squamous cell epithelioma of the maxillary antrum during the period 1968-1978. Nineteen patients received radical craniofacial surgery with orbital exenteration and reconstruction; 20 patients underwent the Caldwell-Luc biopsy and drainage procedure followed by megavoltage radiation therapy. A majority of patients presented with advanced disease (85% had Stage 4). Absolute 3-yr survival rates were 37% in surgical patients and 50% in radiotherapy patients. The difference was not statistically significant, but rate of local tumor control achieved by radiation (66%) was better than that achieved by surgery (45%). The 5-yr survival rates for surgical and radiotherapy groups were 31% and 35%, respectively. Quality of survival was considerably better in the the radiotherapy group; surgical patients required prolonged hospitalization not only for primary surgery but also for the facial reconstructive procedures. Radiotherapy may not be limited to an adjunctive role in patients with paranasal sinus tumors. (16 Refs)

20. IRRADIATION OF MALIGNANT TUMORS OF THE PAROTID GLAND.

Viravathana T, Prempree T, Scott RM

(c/o Prempree) Dept. Radiation Therapy, Univ. Maryland Hosp., 22 South Green St., Baltimore, MD, 21201

Acta Radiol Oncol Radiat Phys Biol; 20(2):75-80 1981

The treatment results in a series of 30 patients with parotid gland carcinoma are reported. Postoperative irradiation to the parotid bed and regional lymph node appears to improve the result of treatment. No difference in the results or complications was found between the group of patients treated by external irradiation or external irradiation combined with radium implantation. Irradiation of residual disease was more effective than irradiation of the recurrences. (Author abstract) (15 Refs)

21. RADIOTHERAPY OF ORAL TONGUE CANCER.

Baroncelli G, Feroldi P, Frata P

Istituto del Radio 'O. Alberti', Spedali Civili, 25100 Brescia, Italia

Tumori; 67(4):349-354 1981

The results in the treatment of oral tongue cancer are analyzed to suggest a highly specified therapeutic program. Two hundred and thirty-two cases, radiologically treated at the Istituto del Radio Alberti, Brescia, Italy, from 1964 to 1978 are considered. Depending on the staging, exclusive interstitial curietherapy, exclusive external radiotherapy, or external plus interstitial radiotherapy were applied. The therapy of locoregional lymph nodes was surgical and/or radiological. The statistical analysis deals with actuarial survival, local remission, recurrences and radionecroses. Particular attention is paid to No cases that became N positive. The suggested therapeutic program depends strictly on the staging and defines also the optimal doses. (Author abstract) (29 Refs)

22. EXTRAMEDULLARY PLASMACYTOMA OF THE HEAD AND NECK.

Bush SE, Goffinet DR, Bagshaw MA

Cancer Res. and Treatment Center, Univ. New Mexico Sch. Medicine, 900 Camino de Salud, Albuquerque, NM, 87131

Radiology; 140(3):801-805 1981

Extramedullary plasmacytoma of the head and neck is an uncommon plasma-cell neoplasm that arises most frequently from the soft tissues of the upper airways. Ten patients with extramedullary plasmacytoma of the head and neck received primary external beam megavoltage radiotherapy with doses between 4,000 rad (40 Gy)/29 days and 6,075 rad (60.75 Gy)/42 days. In eight patients the disease was locally controlled, although distant spread of the disease subsequently developed in four of them. Observations of the patients' medical histories, their response to treatment, and patterns of relapse suggest that extramedullary plasmacytoma is a separate clinicopathologic entity from other plasma-cell tumors and is appropriately managed by local irradiation (Author abstract) (16 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

23. SPLENIC IRRADIATION IN B-PROLYMPHOCYTIC LEUKAEMIA.

Oscier DG, Catovsky D, Errington RD, Goolden AW, Roberts PD, Galton DA
(c/o Catovsky) MRC Leukaemia Unit, Royal Postgraduate Medical Sch., Hammersmith Hosp., London W12 0HS, England
Br J Haematol; 48(4):577-584 1981

Twelve patients with B-cell prolymphocytic leukemia (PLL) were treated with splenic irradiation at a weekly dose of 100 cGy to a max total dose of 1,000 cGy. There was no morbidity associated with this treatment. Seven patients responded. Three achieved a good response and four a partial response. Two of the patients who had a partial response have subsequently died of unrelated causes. Four of the five patients who failed to respond have died as a result of their disease. When more than 25% of the prolymphocytes formed rosettes with mouse red blood cells (MRBC) the patients appeared to respond better to splenic irradiation. There was no correlation between response and the initial white cell count or the size of the spleen. (Author abstract) (9 Refs)

24. TESTICULAR LEUKEMIC RELAPSE: RATE OF REGRESSION AND PERSISTENT DISEASE AFTER RADIATION THERAPY.

Mirro J, Wharam MD, Kaizer H, Zinkham W, Leventhal BG
Div. Pediatric Oncology, Johns Hopkins Oncology Center, 600 N. Wolfe St., Baltimore, MD, 21205
J Pediatr; 99(3):439-440 1981

A 3.5-yr-old male with the common form of acute lymphoblastic leukemia who had persistent testicular leukemia after receiving radiation therapy of 2,600 rads at 200 rads per fraction over 18 days is described. There is no report of a patient with ALL receiving this dose schedule of radiotherapy who had persistent disease. It has been suggested that rate of regression of testicular enlargement is rapid after radiotherapy and that no further reduction in size occurs after 1 mo. It is suggested that, on the basis of a retrospective study of five patients who developed testicular disease after discontinuing systemic therapy, regression of testicular enlargement is variable after completion of radiation therapy. In 4/5 patients, the testes had not completely regressed to their previous size by 6 wk after the completion of radiation therapy and in two patients, regression continued for more than 6 mo. The prevention, diagnosis, and treatment of testicular relapse is discussed. (9 Refs)

25. MEASUREMENT AND CALCULATION OF OVARY AND FETUS DOSE IN EXTENDED FIELD RADIOTHERAPY FOR 10 MV X RAYS.

Sharma SC, Williamson JF, Khan FM, Lee CK
Dept. Therapeutic Radiology, Univ. Minnesota Hosp., Box 494 Mayo, 420 Delaware St. S.E., Minneapolis, MN, 55455
Int J Radiat Oncol Biol Phys; 7(6):843-846 1981

Ovarian and fetal exposure resulting from extended field radiotherapy (10 millivolt x-rays) for Hodgkin's disease or non-Hodgkin's lymphomas was estimated. Doses received by a phantom loaded with thermoluminescent LiF detectors were measured as a function of distance from the edge of typical mantle, periaortic, and inverted Y fields. Both the periaortic and inverted Y irradiation measurements are applicable to the two oophoropexy techniques used to preserve ovarian function in young women before total nodal radiotherapy: relocation of the ovaries at the midline behind the uterus (1), and lateral transposition of the ovaries to the bilateral iliac wings (2). For periaortic fields, the ovary dose in situation 1 is 0.8%, compared with 0.3% in situation 2. For inverted Y field irradiation, the dose is 3x higher for situation 1. Additional blocking to shield a patient from collimator leakage will reduce the fetal dose significantly for mantle field irradiation. Clarkson's algorithm may be applied with reasonable accuracy to estimate scatter doses for points outside the irradiated vol. (11 Refs)

26. MEGAVOLT ELECTRON IRRADIATION FOR LOCALIZED MYCOSIS FUNGOIDES.

Lo TC, Salzman FA, Costey GE, Wright KA
Lahey Clinic Medical Center, 41 Mall Road, Box 541, Burlington, MA, 01805
Acta Radiol Oncol Radiat Phys Biol; 20(2):71-74 1981

A retrospective analysis was carried out to evaluate the effectiveness of small field megavolt electron irradiation for localized mycosis fungoides. Only local field electron beam therapy was employed for limited disease reserving total skin electron irradiation for multiple lesions or diffuse disease covering at least 25% of the entire body surface. Of the 14 patients with limited disease treated between 1964 and 1973 with the local field technique, 10 patients (71%) are alive without evidence of disease at a minimum of 5 yr. In contrast, of 200 patients with extensive cutaneous disease who received total skin electron irradiation, only 16 (8%) were considered cured. It is concluded that early localized mycosis fungoides is potentially curable, and that limited field electron beam therapy with a relatively low total dose is adequate to obtain excellent response. (Author abstract) (17 Refs)

MUSCULOSKELETAL NEOPLASMS

27. CHORDOMA.

Saxton JP
Dept. Radiotherapy, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
Int J Radiat Oncol Biol Phys; 7(7):913-915 1981

From 1948 to 1976 19 patients were treated for tumors diagnosed as chordoma; ages ranged from 4-80 yr, with 5 under 16 yr; 12 were male. Sites involved included 6 basisphenoid, 2 lumber spine, and 11 sacrococcygeal area. Four cases were treated by surgery only, six received radiation therapy (RT) only with doses of 4,000-6,500 rad, and nine received a combination of surgery plus RT with radiation doses of 3,500-7,000 rad. All those treated by surgery only died after survival times of 0-36 mo. All those receiving RT only also died, but survival times were much longer (4-60 mo). There was no correlation between dose and length of remission. Three of those receiving combined therapy are still alive after 36-80 mo. Those who died had survived for 5-51 mo. Palliation was greatest with combined therapy and poorest with surgery only. Determination of cure was difficult because of the slow progression of the disease. Results suggest that local tumor control can be achieved after resection of the obvious tumor mass by radiotherapy of up to 7,000 rad. Such high doses might produce the best results when given over a protracted period of time. (8 Refs)

28. PRIMARY MEDIASTINAL SEMINOMA.

Bush SE, Martinez A, Bagshaw MA
Cancer Res. Treatment Center, Univ. New Mexico Sch. Medicine, 900 Camino de Salud, Albuquerque, NM, 87131
Cancer; 48(8):1877-1882 1981

Primary mediastinal seminoma is a rare germ cell neoplasm histologically identical to testicular seminoma. Thirteen patients have been treated with definitive megavoltage radiotherapy at the Stanford University Medical Center, Division of Radiation Therapy, between 1961 and 1976. Doses ranged from 2,500 rads over 5 wk to 6,000 rads over 7 wk. Actuarial survival at 10 yr is 69% with relapse-free survival of 54%. No patient receiving greater than 4,700 rads to the primary lesion had local or systemic relapse. Patterns of relapse and recommendations for diagnostic evaluation are discussed. Primary megavoltage irradiation to the mediastinum and neck with a dose of 4,500 to 5,000 rads over 5 to 6 wk is appropriate treatment. (Author abstract) (10 Refs)

29. SINGLE-DOSE HALF-BODY IRRADIATION FOR THE PALLIATION OF MULTIPLE BONE METASTASES FROM SOLID TUMORS: A PRELIMINARY REPORT.

Salazar OM, Rubin P, Hendrickson FR, Poulter C, Zagars G, Feldman MI, Asbell S, Doss L
Div. Radiation Oncology, Univ. Rochester Cancer Center, P.O. Box 647, 601 Elmwood Ave., Rochester, NY, 14642
Int J Radiat Oncol Biol Phys; 7(6):773-781 1981

Results of a Radiation Therapy Oncology Group study of escalating doses of half-body irradiation (HBI) for the relief of pain in patients with multiple bone metastases are reported. Of 91 evaluable patients (49 males and 42 females), 52 received lower HBI (LHBI), 12 received mid-body irradiation (MBI), and 27 received upper HBI (UHBI). Doses tested were 600, 700, and 800 rad for the UHBI group and 800, 900, and 1,000 rad for the LHBI and MBI groups. The most common primary tumor sites were breast (36%), prostate (35%), and lung (18%). After HBI, 19 patients experienced complete pain relief, 41 greater than 50% relief, and 10 some relief. Of the 70 responders, greater than 50% achieved relief within 48 hr of HBI and almost 80% achieved relief by the end of 1 wk. Relief of pain lasted for almost 70% of the remaining life of the 70 patients (mean survival, 21 wk); duration of relief was longest for breast cancer patients (20 wk), shortest for lung cancer patients (8 wk), and intermediate for prostate cancer patients (12 wk). Increasing the dose from 600 to 800 rad was beneficial, but 800-1,000 rad did not yield better symptomatic responses. HBI appears as effective as conventional fractionated therapy for multiple bone metastases. (21 Refs)

30. THE RESULTS OF DIFFERENT FRACTIONATION SCHEMES IN THE PALLIATIVE IRRADIATION OF METASTATIC MELANOMA.

Katz HR
Dept. Radiotherapy, American Oncologic Hosp., Central and Shelmire Streets, Philadelphia, 19104
Int J Radiat Oncol Biol Phys; 7(7):907-911 1981

In a study of 137 courses of palliative radiation therapy of 86 patients with skin, lymph node, viscera and bone metastases from melanoma, high dose (HDF; 500 rad or more) and conventional dose fractions (LDF; 400 rad or less), as well as total dose were compared on the rate, duration and permanence of response. In agreement with previous studies, the patients with skin, lymph node and visceral metastase s responded more often to HDF (72%) than to conventional fractionation (27%); this difference was significant (p less than 0.01). In those with bone metastases responses were about equal: 14/19 (74%) and 23/29 (79%) in those treated with LDF and HDF, respectively. There was an 88% response rate in patients with bone metastases who received total doses of over 3,000 rad compared to 72% with treatment of under 3,000 rad; this difference was not significant. The clinical significance of these findings in the palliative treatment of melanoma metastatic to bone is discussed. (14 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

31. MULTIDISCIPLINARY TOTAL CELL KILL TREATMENT OF BRONCHOGENIC SMALL CELL ANAPLASTIC CARCINOMA.

Ota K, Nishimura M, Urata A, Murakami M, Goto T, Nakanishi F, Morita K
Second Dept. Internal Medicine, Aichi Cancer Center Hosp., Chikusa-ku, Nagoya 464, Japan
Gan To Kagaku Ryoho; 8(4):505-513 1981

The survival time of patients with bronchogenic small cell anaplastic cancer was studied. Combined treatment with six-drug combination chemotherapy 'METVFC' (mitomycin C + cyclophosphamide + Toyomycin + vincristine + 5-fluorouracil + cytosine arabinoside) and radiotherapy (5,000 rads in total) was used in 14 cases of limited disease of small cell carcinoma. Median survival was 8 mo; 1 yr and 2 yr survival rates were 47% and 27%, respectively. Combined treatment with METVFC and small dose radiotherapy of 100 or 200 rads irradiation 4 hr before chemotherapy, followed by remission consolidation of 3,000-4,000 rads radiotherapy, thereafter second line chemotherapy of 'COAM' [cyclophosphamide + vincristine + 1-(4-amino-2-methyl-5-pyrimidinyl)methyl-3-(2 chloroethyl)-3-nitrosourea (ACNU, NSC D245382) + methotrexate] was used in four cases of limited disease of small cell carcinoma. All cases survived more than 1.5 yr and two of them have retained complete remission for more than 1.5 yr. There are 6 cases with small cell carcinoma surviving more than 3 yr out of a total of 128 cases of limited disease. They received combined treatment of chemotherapy and radiotherapy simultaneously or alternatively, followed by remission maintenance chemotherapy. One case died from cancer. Two cases died from another disease without lung cancer. Three surviving cases remained healthy for 3 to 8 yr. In limited disease, small cell carcinoma of the lung might be curable if complete remission could continue for more than 3 yr. (11 Refs) (In JPN)

32. RISK OF BRAIN METASTASIS FROM SMALL CELL CARCINOMA OF THE LUNG RELATED TO LENGTH OF SURVIVAL AND PROPHYLACTIC IRRADIATION.

Komaki R, Cox JD, Whitson W
Div. Therapeutic Radiology, Medical Coll. Wisconsin Affiliated Hosp., 8700 W. Wisconsin Ave., Milwaukee, WI, 53226
Cancer Treat Rep; 65(9):811-814 1981

The problem of brain metastasis from small cell carcinoma (SCC) of the lung has been appreciated for many yr, but the magnitude of the problem has been underestimated. Recent studies have shown that the risk of brain metastasis increases as survival is prolonged. Although prophylactic cranial irradiation (PCI) has reduced the frequency of brain metastases, the effect on risk estimates of differences in the periods of observa-

tion was not evaluated. From 1974 through 1979, 131 patients with SCC of the lung who had no evidence of brain metastasis by radionuclide or computerized tomographic scan were treated in the Division of Therapeutic Radiology at the Medical College of Wisconsin Affiliated Hospitals. PCI was started in 1977; 57 patients received it and 74 did not. To correct for the differing periods of observation for the two groups, an actuarial calculation of the probability of brain metastasis was used. The calculated rate of clinical failure in the brain for patients who did not receive PCI was 28% at 12 mo and 58% at 24 mo. The calculated failure rate in the brain for patients who received PCI was 11% at 12 and 24 mo. The difference in the probability of brain metastasis between the patients who did or did not receive PCI is highly significant (p less than 0.01). The true benefit of PCI becomes apparent only when the risk of intracranial metastasis is evaluated by methods that correct for incomplete followup. PCI eliminates the progressive increase in the risk of brain metastasis that accompanies increased survival and is important to maximize the probability for cure of patients with SCC. (Author abstract) (15 Refs)

33. RADIOTHERAPY IN THE MANAGEMENT OF LOCALLY ADVANCED LUNG CANCER OF ALL CELL TYPES: FINAL REPORT OF RANDOMIZED TRIAL.

Petrovich Z, Stanley K, Cox JD, Paig C

Radiation Therapy Service, Wadsworth Medical Center, Los Angeles, CA, 90073

Cancer; 48(6):1335-1340 1981

Between 1975 and 1978, 343 evaluable male patients with a diagnosis of locally advanced lung cancer of all cell types were entered in Protocol 15. The patients had unresectable or inoperable tumor limited to one hemithorax and no evidence of distant metastases. The cell-type distribution was as follows: squamous cell carcinoma (Sq CC) 137 (40%); positive cytology 66 (19%); large cell carcinoma 57 (17%); small cell carcinoma (SCC) 46 (13%) and adenocarcinoma 37 (11%). An intermediate course of irradiation (ICI) of 5,000 rads in 25 fractions, 200 rads each, in 5 wk was compared with a short course of irradiation (SCI) of 4,200 rads in 15 fractions, 280 rads each, in 3 wk (equal Nominal Standard Dose). The effectiveness of low dose irradiation to control subclinical brain metastases was studied and was reported separately. The median survival for all 343 patients was 38 wk. There was no significant difference in survival, response and control rate between the 191 ICI and the 152 SCI patients. The following factors had a significant indivi dual influence on survival: initial performance status, ambulatory vs nonambulatory, $p = 0.006$; histology, Sq CC vs other cell types (OCT), $p = 0.0007$; prior surgery, less than 6 wk vs greater than 6 wk, $p = 0.04$; tumor size, diameter less than 6 cm vs greater than 6 cm, $p = 0.05$ and wt loss less than 5% vs greater than 5% in the previous 6 mo, $p = 0.01$. The overall response rate (CR or PR) was 38%. The median duration of response was shorter for the ICI group when compared with the SCI group, 18.4 vs 34.4 wk, $p = 0.02$. The presence of partial or complete response enhanced the median survival 50 vs 31 wk. Cell type, Sq CC vs OCT was an important factor for duration of response, 49 vs 21 wk, $p = 0.0006$. The complication rate was similar for the 191 ICI patients when compared with the 152 SCI patients. There were however, two patients with radiation myelopathy among the SCI patients and none among the ICI patients. (Author abstract) (23 Refs)

34. COMPUTERIZED TOMOGRAPHY SCANNING AND THE PLANNING OF HIGH-DOSE RADIOTHERAPY FOR PLEURAL MESOTHELIOMA: A REPORT OF FIVE PATIENTS.

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Int J Radiat Oncol Biol Phys; 7(6):821-826 1981

Computerized tomography (CT) scanning was used as an adjunct to radiotherapy planning in five men with pleural mesothelioma treated by a lung-sparing external beam irradiation technique. C-shaped fields of 42-millivolt photon beams from a betatron provided coverage of the apical, mediastinal, and diaphragmatic pleura; eccentrically rotating photon beams (shell fields) irradiated the parietal pleura. Dimensions of the C-shaped fields and shell parameters were obtained from CT scans and orthogonal radiographs. Two patients received the shell irradiation as a 2,500 rad boost following 4,000-5,000 rad from three fixed electron beams and L-shaped opposing photon fields. The three patients who were treated by the shell technique alone received 5,000 rad in 25 fractions over both C-shaped and shell fields. The only patient who responded to treatment is alive with no evidence of disease 29 mo following treatment. Radical radiotherapeutic techniques alone are not thought sufficient to control pleural mesothelioma. (20 Refs)

35. SUPERIOR SULCUS TUMORS: RESULTS OF IRRADIATION OF 36 PATIENTS.

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Div. Radiotherapy, Medical Coll. Wisconsin, 8700 West Wisconsin Ave., Milwaukee, WI, 53226

Cancer; 48(7):1563-1568 1981

Thirty-six patients with superior sulcus tumors were treated primarily with irradiation at the Medical College of Wisconsin Affiliated Hospitals between 1963-1977. Two patients were Stage II (T2N0) and 34 patients were Stage III (22: T3N0 and 12: T1-3N2). Local control correlated posi tively with the field size for the thoracic irradiation, but not with total dose (between 40 Gy in 4 wk and 64 Gy in 6 1/2 wk). Thirty-one patients (86%) had relief of symptoms for a median of 12 mo after irradiation. Seventeen patients (47%) achieved local control and showed a significantly longer median survival (26.5 mo vs 6.5 mo) and a higher probability of 5-yr survival (45% vs 0) compared with those who did not. Of 19 patients with local failure, distant metastases developed in 9. The most common first and single metastatic site was the brain. Brain metastases developed in seven patients, six of whom had control of the primary tumor. Three of them were alive at 65, 35, and 25 mo after whole-brain irradiation. The 5-yr actuarial survival rate was 23%. There were no major complications. The prognosis was related to local control, but was unrelated to age, histology, symptoms, and signs at presentation, or mediastinal involvement, perhaps the result of the small number of patients studied. The prognosis for patients with superior sulcus tumors is more favorable than other presentations of carcinoma of the lung, but patients are especially at risk for single-organ brain metastases. Primary external radiotherapy is as effective as combined approaches and has a low complication rate; therefore, it is to be preferred for most patients with apical tumors. (Author abstract) (23 Refs)

INSTRUMENTATION AND TECHNOLOGY

36. RADIOTHERAPY PLANNING USING COMPUTED TOMOGRAPHY.

Breit A, Gfirtner H, Atzinger A
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Cancer; 48(6):1341-1345 1981

A critical look at the use of computed tomography (CT) for radiation therapy planning shows problems which all arise from incorrect positioning of the patient. CT is an excellent tool for therapy planning if the patient is positioned identically at the CT scanner and on the therapy couch. This is accomplished by installing matching laser systems at the CT scanner and at the therapy machine. The authors' planning procedure is discussed in detail. (Author abstract) (8 Refs)

37. COBALT-60 THERAPY UNIT FOR LARGE FIELD IRRADIATION.

Leung PM, Rider WD, Webb HP, Aget H, Johns HE
Dept. Physics, Ontario Cancer Inst., Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 7(6):705-712 1981

Design and construction of a cobalt-60 therapy unit at the Ontario Cancer Institute are described. The unit produces large field sizes through the use of large collimator openings and conventional source-to-skin distances. It gives fields up to 50 x 160 square cm at a source-to-surface distance of 90 cm, with a dose rate of 100-200 rad/min, depending on which of three electron filters is used. All three filters improve the build-up characteristics of the beam, and two also act as beam flatteners. For half-body irradiation, the beam edge can be made vertical by completely closing one of the longitudinal collimators. The treatment time is short, compared with most other radiation facilities. (11 Refs)

38. DOSIMETRY, FIELD SHAPING AND OTHER CONSIDERATIONS FOR INTRA-OPERATIVE ELECTRON THERAPY.

Biggs PJ, Epp ER, Ling CC, Novack DH, Michaels HB
Dept. Radiation Medicine, Massachusetts General Hosp., Boston, MA, 02114
Int J Radiat Oncol Biol Phys; 7(7):875-884 1981

Experience in the development of an intra-operative radiotherapy (IOR) program using beams of high energy electrons is presented. The design and use of a sterilized acrylic resin cone that slides into a metal holder attached to the head of the accelerator are described. Dosimetry was investigated as a function of the primary collimator setting of the linear accelerator; criteria for the choice of a fixed setting are given. Sterile lead sheets cut to the appropriate size were used to achieve field shaping and to block critical organs. Improvement in beam design may be achieved by increasing the incident electron dose rate and by improving the depth dose at each energy. Recommendations for the overall design of a dedicated IOR suite are presented. Treatment data for 42 patients who have undergone this IOR procedure are given and analyzed. The program is too new to have accumulated data on clinical efficacy. The development phase has been quite successful with respect to the machinery, dosimetry system, and staff acceptance of the program. (11 Refs)

39. THE OUTLOOK FOR INTRAOPERATIVE RADIOTHERAPY.

Goldson AL
Dept. Radiotherapy, Howard Univ. Hosp., Washington, DC, 20060
Int J Radiat Oncol Biol Phys; 7(7):979-980 1981

Advantages and disadvantages of intraoperative radiotherapy (IOR), the radiation treatment of a surgically exposed tumor with an x-ray or particle beam during an operation, are discussed. Through the use of IOR a higher dose of radiation can be administered since other radiosensitive organs can be avoided and the beam can be directed more precisely to the tumor area. Advantages of IOR over the use of interstitial implants, include the ability to obtain a satisfactory dose distribution in the tumor bed and lymph node areas where there is little malignant tissue for implant. Following IOR, no radiation safety precautions for hospital personnel and patient's family are required. The logistic problems of combining an operating and radiation facility provide the main stumbling block to use of IOR. (3 Refs)

40. A RADIATION ONCOLOGY ORIENTED ANATOMICO-PATHOLOGICAL CLASSIFICATION SYSTEM.

Lee JY, Perez CA
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Int J Radiat Oncol Biol Phys; 7(6):813-815 1981

A coding system developed at the Mallinckrodt Institute of Radiology and designed to support a radiation oncology patient information system is presented. Demographic, diagnostic, treatment, and follow-up data are collected on all patients and stored in the computerized information system. Because patient groups are most frequently defined by primary tumor site and pathology, two extensive classification systems have been developed for anatomic sites and pathology. The codes are hierarchical to reflect the detail available in clinical diagnosis. Pathology codes cover malignant neoplasms, lymphomas, metastatic disease, benign nonneoplastic disease, and complications of radiotherapy. Data quality control is maintained by cross checks between the site and pathology codes. In addition to providing a data base for research oncologists, the information system may be used to evaluate feasibility of proposed clinical trials. (3 Refs)

41. HYPOXIC CELL RADIOSENSITIZERS - PRESENT AND FUTURE.

Wasserman TH
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Int J Radiat Oncol Biol Phys; 7(6):849-852 1981

The development of Phase I, II, and III trials for hypoxic cell radiosensitizers by the NCI, Division of Cancer Treatment, in conjunction with the Radiation Therapy Oncology Group is discussed. Misonidazole (MIS) is the main drug tested to date, and there are currently seven Phase III clinical trials which compare radiation with or without MIS. However, researchers predict that a new compound, SR-2508, will have the same radiosensitizing efficiency as MIS but will be less neurotoxic. The prediction is based on the drug's lower penetration to neural tissues, lower lipophilicity, and more rapid pharmacokinetics. The major limitation to development of new MIS analogs is a lack of animal models for MIS-induced peripheral neurotoxicity in humans. A Phase I clinical pharmacology toxicology trial of the MIS analog desmethylmisonidazole

(DESMIS) is now in progress. DESMIS also exhibits lower penetration to peripheral nerves, cerebrospinal fluid, and brain. Phase II clinical trials of DESMIS and SR-2508 might not be necessary if the agents prove administrable in individual doses giving blood levels sufficient to yield radiation enhancement ratios of 1.5-2.0, and if 20-30 doses can be administered without significant toxicity. Instead, Phase III trials could be initiated to compare the efficacy of radiation with and without radiosensitizer. (13 Refs)

42. INTERSTITIAL HYPERTHERMIA AND INTERSTITIAL IRIDIUM 192 IMPLANTATION: A TECHNIQUE AND PRELIMINARY RESULTS.

Joseph CD, Astrahan M, Lipsett J, Archambeau J, Forell B, George FW

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Int J Radiat Oncol Biol Phys; 7(6):827-833 1981

The feasibility of combining interstitial hyperthermia (41-43 C, for 30-40 min) with interstitial Iridium 192 implantation (Ir-192, 2,000-3,000 rad) in the treatment of superficially accessible tumors has been tested on swine and confirmed in seven patients (3 with primary breast cancer, 1 with neck nodes from a tongue primary, and 3 with sc metastases from malignant melanoma or colon primaries). Therapy protocol consisted of external beam radiotherapy (3,000-4,000 rad in 3-4 wk), followed successively by 3 wk rest, the first hyperthermia session, Ir-192 implantation, and a second hyperthermia session. Techniques and instruments used for positioning the thermal probes and implants are described. (4 Refs)

43. LOCAL MICROWAVE HYPERTHERMIA AND IRRADIATION IN CANCER THERAPY: PRELIMINARY OBSERVATIONS AND DIRECTIONS FOR FUTURE CLINICAL TRIALS.

Perez CA, Kopecky W, Rao DV, Baglan R, Mann J

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Int J Radiat Oncol Biol Phys; 7(6):765-772 1981

A Phase I-II intramural (IM) study of irradiation and hyperthermia was conducted at the Mallinckrodt Institute of Radiology on 29 patients with recurrent or metastatic superficial tumors. The lesions were treated with 400 rad fractions given every 72 hr (2x/wk) for a total dose of 2,400-4,000 rad followed by hyperthermia (42-43 C, 90 min). Six additional lesions were treated according to the Radiation Therapy Oncology Group (RTOG) randomized protocol consisting of three doses of 500 rad followed by hyperthermia; 12 control lesions were treated with radiation alone (3 doses of 600, 700, or 800 rad). Of the lesions treated according to IM, 9/12 recurrent epidermoid carcinomas of the head and neck, 4/5 metastatic melanoma nodules, 5/9 recurrent adenocarcinomas in the chest wall, and 3/3 sarcomas showed complete regression. Partial regressions were obtained in four tumors. Of the lesions treated by RTOG, two metastatic melanomas showed complete regression and three tumors exhibited partial regression. Nine of the 12 control lesions showed complete regression after irradiation alone and 3 tumors regressed 50% or more. Radiation doses and heat were well tolerated by normal tissues; of the 35 sites treated, 11% developed blisters, 20% erythema, 77% dry desquamation, and 8% moist desquamation. In contrast, 25% of 12 control patients treated with irradiation alone (2,100-2,400 rad in 3 fractions) developed moist desquamation. (26 Refs)

44. CLINICAL EXPERIENCE WITH RADIOFREQUENCY HYPERTHERMIA.

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J Microwave Power; 16(2):193-197 1981

Clinical experience with radiofrequency (RF) hyperthermia in the treatment of va rious superficial malignancies is reported. For the RF techniques currently available, local hyperthermia can be achieved only for tumors that are superficial (depths of the order of 2 cm with typical applicators, up to 6 cm with cooling, multiple electrodes, movement of coils, etc). The presence of inhomogeneities must be considered in treatment planning. Thus, different anatomic locations require specialized applications. Temperature differentials between normal tissue and tumors are discussed. Preferential heating appears to be size dependent: smaller tumors are more difficult to heat. In a study involving 86 cancer patients (38 malignant melanoma, 15 mycosis fungoides, 6 lymphoma, 10 breast carcinoma, 3 chondrosarcoma, 14 other tumors), the overall complete tumor response rate following combination hyperthermia and radiation therapy (69/86, 80%) was superior to that obtained with radiotherapy alone (24/73, 33%). Important parameters for a successful control of the radioresistant tumors included a good thermal distribution within the tumor vol, a differential heating pattern between tumor and normal tissue, the radiation time dose fractionation schedules, and the sequence of combination therapy. Possibilities for future clinical studies are briefly discussed. (5 Refs)

45. SOME PRACTICAL CONSIDERATIONS FOR THE USE OF LOCALIZED HYPERTHERMIA IN THE TREATMENT OF CANCER.

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J Microwave Power; 16(2):199-204 1981

The use of microwave and radiofrequency hyperthermia for treatment of cancer is discussed with respect to general considerations of patient selection, treatment options, and clinical observations. For microwave hyperthermia, waveguide, printed circuit antenna arrays, and coaxial radiators may be used as applicators. In selecting the best approach to treatment of a given patient, factors to be considered include the size and location of the tumor, tumor vascularity, and the thermal characteristic of the tumor site. Most patients considered for hyperthermia treatment have been found unresponsive to other conventional methods. The nature and extent of previous therapy must be considered. In patients still tolerant to radiation therapy (RT), hyperthermia is given after RT to insure higher therapeutic gain. With microwave-induced hyperthermia, there have been few systemic effects; superficial burns and vesiculation may be a problem at particular tumor sites. With radiofrequency-induced hyperthermia, the systemic effects are much more pronounced; one of the most troublesome problems occurs with fat necrosis. Methods to offset such side effects are discussed. (4 Refs)

46. HYPERTHERMIA FOR BRAIN TUMORS: BIOPHYSICAL RATIONALE.

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Div. Neurological Surgery, Univ. Maryland Hosp., 22 South Greene St., Baltimore, MD, 21201

Neurosurgery; 9(3):327-335 1981

The biophysical basis for the use of hyperthermia in cancer is reviewed, and in particular, the rationale of its application to the problem of malignant brain tumors. Hyperthermia is effective against poorly vascularized and metabolically quiescent tissues, its biological effect is related to the duration and intensity of its application, it appears to have no cumulative toxicity, and it potentiates the effects of both chemotherapy and ionizing radiation at the cellular level. The cellular and antineoplastic effects of hyperthermia are relatively independent of cell cycle and metabolic considerations, and the effects are potentiated by hypoxia and inadequate tissue cooling. The safety and feasibility of both small and large field heating in the human brain has been demonstrated by at least three different techniques. The use of microwaves for hyperthermia of brain tumors is described. The single radiator/sensor is currently being used in Phase I clinical trials in order to establish technical feasibility, patient safety, and patient tolerance. Malignant brain tumors in humans are unable to dissipate heat efficiently, compared to the normal feline brain. The use of multiple interstitial microwave radiator/sensor systems in conjunction with computed tomographic scanners and treatment planning computers may allow complete and effective heating of unresectable human brain tumors. (81 Refs)

47. CLINICAL HYPERTHERMIA TRIALS: DESIGN PRINCIPLES AND PRACTICE.

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J Microwave Power; 16(2):171-177 1981

While microwave and radiofrequency thermotherapy systems have demonstrable medical need and an adequate biophysical rationale, their clinical evaluation has often suffered from inadequate or inappropriate preclinical laboratory experimentation. The size and shape of a thermal field should be studied within the organ or organs of interest in animals rather than in phantoms. In vivo experiments provide assurance that gross effects are not detectable upon the most frequently monitored clinical and physiological parameters. Thresholds for biological damage should be experimentally established at temperatures, durations, and power levels of clinical interest in normal tissues. Phase-I clinical trials should be conducted in patients who have already exhausted conventional therapeutic options. Physical dose-response relationships and toxicity data are developed in Phase I trials. Preliminary and follow-up trials (Phase IIA and IIB) are performed in order to determine if the single new therapy is effective in a given patient population and to estimate dose/response and response rates. A phase-III trial is indicated only if the dev ice or drug has a reasonable likelihood of therapeutic response at clinically tolerable doses. Currently, for most organ systems, diseases and hyperthermia devices, an insufficient body of data exists to justify carrying out a phase-III trial. Ethical issues involved are discussed with respect to the institutional review board and Federal requirements for informed patient consent. (41 Refs)

48. HYPERTHERMIA PRODUCTION FOR CANCER THERAPY: A REVIEW OF FUNDAMENTALS AND METHODS.

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J Microwave Power; 16(2):89-105 1981

The production of hyperthermia for cancer therapy is reviewed with respect to basic mechanisms of several popular heating modalities, including electromagnetic methods at both high and low frequencies with various applicators, and the emerging ultrasonic techniques. Some of the basic constraints governing the heating patterns from these devices, such as depth of penetration and focusing capabilities were investigated and areas of optimum application for each technique were tested. The power deposition of ultrasound as a function of frequency and focus depth was explored in detail. A comparison was made between electromagnetic and ultrasound applicators with regard to achievable heating patterns. The problem of temperature measurement was examined for each modality and examples of appropriate monitoring devices were given. A system composed of a combination of electromagnetic and ultrasonic modalities with a variety of applicator styles and sizes appears best suited to clinical tasks. (44 Refs)

49. CLINICAL RADIOFREQUENCY HYPERTHERMIA BY MAGNETIC-LOOP INDUCTION.

Storm FK, Harrison W, Elliott RS, Kaiser LR, Silberman AW, Morton DL

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J Microwave Power; 16(2):179-184 1981

The use of radiofrequency-induced hyperthermia for cancer treatment is discussed. Temperatures of 42-44 C may be tumoricidal to malignant cells. The induction coil and capacitive plates are standard radiofrequency applicators, but each has limitations. The magnetic-loop applicator was developed to provide internal hyperthermia regardless of tumor depth and the thickness of overlaying surface tissues. Clinical trials were conducted with a 1 kilowatt generator at 13.56 megahertz (MHz) at 25-1,000 watts absorbed power in 25 patients with superficial tumors who were treated with 25-225 square cm paired capacitance electrodes with or without surface cooling and in 64 patients with 1 cm or more of overlaying surface tissues and internal tumors. Temperatures of 42 C or more were possible in 69/89 (78%) tumors, 45 C or more in 32 (36%), and 50 C or more in 22 (25%), while normal tissues remained within a physiologic temperat ure range. Tumor heating capacity appeared to be independent of the type of cancer. Of the 53 tumors 5 cm or more in the least dimension, 89% could be effectively heated to 42 C or more, while of the 36 tumors less than 5 cm, 22 (61%) could be effectively heated. In 19/22 tumors in which more than one temperature monitor was placed, the interface was cooler than the av tumor temperature. Higher temperature, longer treatments, and multiple treatments may be most effective. Biopsy may be necessary to evaluate the results of high-temperature hyperthermia in internal cancers. Nontumorous tissue with compromised blood flow may have reduced thermotolerance. (23 Refs)

PRE-CLINICAL STUDIES

50. EXPERIMENTAL CHEMO- AND RADIOTHERAPY ON HUMAN CHOLANGIOCARCINOMA TRANSPLANTED TO NUDE MICE.

Kubota T, Hanatani Y, Yamada Y, Tsuyuki K, Nakada M, Asanuma F, Ishibiki K, Abe O
Dept. Surgery, Sch. Medicine, Keio Univ., Tokyo, Japan
Nippon Gan Chiryo Gakkai Shi; 16(3):414-421 1981

Nude mice bearing a serially transplanted human cholangiocarcinoma (Ch-1) were treated with chemotherapy and radiotherapy alone or in combination. Mitomycin C (MC) was more effective than adriamycin in terms of tumor regression, histologic findings, and minor side effects. MC and radiotherapy (Linac x-rays) gave exponential linear tumor wt-dose response curves. MC at 1 mg/kg and radiation at 1,000 rads/mouse were equivalent in their effects on tumor wt and histology. Combination chemoradiotherapy had a synergistic effect when radiation (500 rads/mouse) preceded MC (0.5 mg/kg) administration, but an additive effect when the sequence was reversed. Impulse cytophotometry showed that the tumor labeling index (3H-thymidine uptake) was depressed approx 10% after MC (0.5 mg/kg) and radiation (500 rads/mouse). The mitotic index was slightly depressed by MC, but it was stable after radiation. These findings suggested the recruitment of cells from G1 to G2M and the G1 block by MC and radiation. (21 Refs) (In JPN)

51. EFFECTS OF SINGLE-DOSE IRRADIATION ON TUMOR BLOOD FLOW STUDIED BY 15O DECAY AFTER PHOTON ACTIVATION IN SITU.

Emami B, Haken RK, Nussbaum GH, Hughes WL
Div. Radiation Oncology, Mallinckrodt Inst. Radiology, Washington Univ. Sch. Medicine, 510 S. Kingshighway, St. Louis, MO, 63110
Radiology; 141(1):207-209 1981

A noninvasive technique employing photon activation of tissue oxygen in situ and detection of subsequent 15O positron decay was used to study the effects of single-dose 60Co irradiation on capillary blood flow in transplanted rat rhabdomyosarcomas. Tumor blood flow was measured before irradiation with 16.5, 38.5, or 60.5 Gy and at several intervals afterward (0-72 hr). Pre-irradiation values of vol-av blood flow in the tumor ranged from 7 to 44 ml/min/100 g. Several hr after irradiation, blood flow was u p to 50% for 60.5 Gy and up to 35% for 16.5 Gy. However, 24 hr after irradiation, tumor blood flow had recovered completely in the 16.5-Gy group and substantially in the others. For smaller doses such as the fractions typically employed in radiotherapy, no changes in tumor blood flow were observed. (Author abstract) (10 Refs)

52. SUPPRESSION OF MARROW STROMAL CELLS AND MICROENVIRONMENTAL DAMAGE FOLLOWING SEQUENTIAL RADIATION AND CYCLOPHOSPHAMIDE.

Wathen LM, Knapp SA, DeGowin RL
(c/o DeGowin) Dept. Internal Medicine, Univ. Iowa Hosp., Iowa City, IA, 52242
Int J Radiat Oncol Biol Phys; 7(7):935-941 1981

Hemopoietic damage to female CF-1 mice following sequential radiation and cyclophosphamide (CY) administration was studied. The ability of this combined modality treatment to injure the hemopoietic microenvironment and to inhibit the recovery of the bone marrow was examined. Marrow differential counts, stem cells, progenitors, and marrow stromal cells were measured in mice from 1-6 mo following single modality and combined modality treatment. The data presented seemed to support the hypothesis that combined modality therapy with CY and x-irradiation induced residual damage to the bone marrow microenvironment, preventing hemopoietic repopulation for a long period of time. This microenvironmental lesion persisted for at least one quarter of the life span of a normal mouse. Neither 1,500 rad no CY alone was able to suppress the marrow cells or their progenitors to less than 50% of normal at 4 mo postirradiation. However, the combined CY and x-ray treatment produced persistent, greater than additive damage to the microenvironment reflected by decreased marrow stromal cells and failure of the hemopoietic cells and their progenitors to completely repopulate femoral marrow. The mechanisms underlying the microenvironmental damage are discussed. (28 Refs)

53. EFFECT OF CIS-DICHLORODIAMMINE PLATINUM II AND X RAYS ON MAMMALIAN CELL SURVIVAL.

Carde P, Laval F
(c/o Laval), Institut de Recherches de Radiobiologie Clinique (INSERM), 94800 Villejuif, France
Int J Radiat Oncol Biol Phys; 7(7):929-933 1981

The influence of cis-dichlorodiammine platinum II (cis-Pt (II)) on the survival of x-irradiated H4 cells derived from a rat hepatoma was studied in an attempt to determine the potential use of this drug to increase the efficiency of radiotherapy. In studies of cis-Pt (II) cytotoxicity, it was found that plateau phase cells were less sensitive to the drug than were exponential cells. When plateau phase cells were incubated for 1 hr with cis-Pt (II) and then irradiated, the survival curves showed modifications both of the extrapolation number and the slope of the curve. The Do decreased from 140 rad for control cells to 135 rad for the cis-Pt (II)-treated cells. Cis-Pt (II) had the same toxicity in both euoxic and hypoxic plateau H4 cells. However, the decrease in Do was more pronounced when plateau cells were treated with cis-Pt (II). The effects of the cis-Pt (II) on the survival curve and Do of exponentially growing H4 cells were insignificant. The repair of sublethal damage (SLD) was measured in exponentially growing H4 cells treated or not treated with cis-Pt (II). Cis-Pt (II) was found to inhibit the repair of SLD. This inhibition was observed only when the drug was present in the medium during the fractionation period. When plateau phase cells were irradiated with 750 rad and then incubated with cis-Pt (II), the survival increase, observed in control cultures, was no longer evident. The results suggested that combined treatment with cis-Pt (II) and ionizing radiations could increase the efficiency of radiation, especially in the case of stationary cells in hypoxia. (20 Refs)

54. RESPONSE OF MULTICELLULAR TUMOR SPHEROIDS TO MULTIPLE FRACTIONS OF NEGATIVE PI MESONS AND X RAYS.

Kligerman MM, Wilson S, Tanaka Y, Burmester J, Hogstrom KR, Yuhas JM
Dept. Radiation Therapy, Univ. Pennsylvania, Philadelphia, PA, 19104
Int J Radiat Oncol Biol Phys; 7(7):923-927 1981

The responses of multicellular tumor spheroids (MTS) of murine Line-1 lung carcinoma and MCa-11 mammary adenocarcinoma cell lines to negative pi meson (pion) radiation were studied. An 8 cm modulated pion radiation was used, with irradiation carried out at a depth of 8 cm (proximal region) and 14 cm (distal region). MCa-11 MTS were exposed to 3 rad/min at 14 cm and 4 rad/min at 8 cm. Line-1 MTS were exposed to 5 rad/min at 14 cm and 6.5 rad/min at 8 cm. MCa-11 MTS re-

ceived 10 dose fractions in 14 days. Line-1 MTS received 10 dose fractions in 11 days. Some MCa-11 MTS received the same total dose in six fractions. No difference in relative biological effectiveness (RBE) was noted between the proximal and distal regions of the radiation peak, although the amount of high linear energy transfer (LET) radiation was 6% in the proximal region and 10% in the distal region. In both cell lines fractionation of the radiation dose increased the RBE compared to that for a single large dose. The effect was greater in MCa-11, which had a lower Dq in single-cell tests. Fractionation reduced the threshold level for irradiation, but the amount was less than a simple multiple of the amount of reduction produced by one fractional dose. Results appear to indicate that dose calculations for pion radiation therapy may be simplified, since variations in the high-LET content of the total dose had no apparent effect on RBE. (5 Refs)

55. RADIATION RESPONSE OF THE CELLS OF A HUMAN MALIGNANT MELANOMA XENOGRAFT. EFFECT OF HYPOXIC CELL RADIOSENSITIZERS.

Rofstad EK
Norsk Hydro's Inst. for Cancer Res., Norwegian Radium Hosp., Montebello, Oslo 3, Norway
Radiat Res; 87(3):670-683 1981

Factors responsible for the radioresistance of malignant melanomas were studied. The radiosensitizing effect of the two hypoxic cell sensitizers, misonidazole and Ro-07-0741, was examined on a human malignant melanoma xenograft (E.E. malignant melanoma). The plating efficiency for the E.E. malignant melanoma cells was in the range of 15-35% whether the host animal had received one of the radiosensitizers or not. Dose-response curves for cells of the E.E. malignant melanoma irradiated in suspension or as solid tumors in nude mice are presented. The terminal slopes of dose-response curves for cells irradiated as solid tumors in dead and air-breathing mice were not significantly different. The lethal dose (D0) values for the hypoxic tumor cells, from tumors irradiated in either dead or air-breathing mice, were close to that for cells irradiated in suspension under extremely hypoxic conditions. The survival level for tumors left in situ for 14 hr after irradiation and then removed for assay in vitro was higher than that for tumors removed immediately after irradiation. The data indicated that the increased survival level is reflected in both a larger initial slope and an increased D0 value of the dose-response curve. The radiation response was enhanced when the tumors were irradiated in the presence of the hypoxic cell radiosensitizers. The enhancement ratios calculated for tumors removed for assay in vitro 14 hr after irradiation were not significantly different from those calculated for tumors removed immediately after irradiation. The capacity of E.E. malignant melanoma to repair potentially lethal damage was not affected by the presence of the hypoxic cell radiosensitizers during irradiation. Both radiosensitizers were about equally effective in E.E. malignant melanomas. (41 Refs)

56. THE INFLUENCE OF MISONIDAZOLE ON THE RADIATION RESPONSE OF MURINE TUMORS OF DIFFERENT SIZE: POSSIBLE ARTIFACTS CAUSED BY PENTOBARBITAL SODIUM ANESTHESIA.

Wondergem J, Haveman J, Van der Schueren E, Van den Hoeven H, Breur K
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Int J Radiat Oncol Biol Phys; 7(6):755-760 1981

Effects of the hypoxic cell sensitizer misonidazole (MIS) and of pentobarbital anesthesia on the radiosensitivity of a murine mammary adenocarcinoma (M8013X) transplanted into syngeneic male DBA2 x C57BL10 mice were determined. In experiments without anesthesia or MIS, sensitivity of the tumors to a single 15 Gray unit (Gy) dose of x-ray depended on initial tumor vol. An increase in vol from 50 to 350 cubic mm (mm3) was associated with reduction in radiosensitivity. Within a period equal to two to three doublings in tumor size, the tumor growth delay (TGD) after 15 Gy dropped from 19 to 13 days. Use of anes thesia resulted in a decrease in 350 mm3 tumor TGD from 13 to 7 days, but MIS administration increased the TGD to 18 days. In unanesthetized mice, MIS affected the TGD only at doses greater than 10 Gy; with anesthetized mice, however, MIS increased radiosensitivity at all dose levels. The radioprotective effect of the anesthetic in large tumors was almost completely eliminated by MIS, indicating that pentobarbital had increased the tumor hypoxic cell fraction. Anesthesia did not affect small tumor radiosensitivity. The apparently inferior vascularization of larger tumors may account for previously conflicting data on the radioprotective effect of anesthesia. (28 Refs)

57. SR-2508: A 2-NITROIMIDAZOLE AMIDE WHICH SHOULD BE SUPERIOR TO MISONIDAZOLE AS A RADIOSENSITIZER FOR CLINICAL USE.

Brown JM, Yu NY, Brown DM, Lee WW
Dept. Radiology, Stanford Univ. Sch. Medicine, Stanford, CA, 94305
Int J Radiat Oncol Biol Phys; 7(6):695-703 1981

The toxicological, pharmacological, and radiosensitizing properties of misonidazole (MIS), its amide analogs SR-2508 and SR-2555, and its O-demethylated metabolite DESMIS (Ro-05-9963) were compared in studies in vitro and in vivo. LD50 and neurotoxicity assays in BALB/c female mice showed that SR-2508 and SR-2555 were close to optimum in terms of low toxicity. SR-2508 in particular had to be given in daily doses 3.1x greater than those of MIS (ie, greater than 2.0 mg/g, ip or iv, for 5 wk) to produce equivalent neurotoxicity in BALB/c female mice. The lower neurotoxicity of the amide analogs relative to MIS was due to their lower lipophilicity and slower penetration into neural tissues. In vitro radiosensitization experiments with hypoxic Chinese hamster ovary cells demonstrated that SR-2508, MIS, and DESMIS were comparable in their radiosensitizing effectiveness; SR-2555 was a less efficient radiosensitizer. The comparative in vivo radiosensitizing efficiency of MIS, SR-2508, and SR-2555 was determined in an in vivo-in vitro cloning assay with BALB/c EMT6 tumors, in regrowth delay assays with the BALB/c KHJJ carcinoma and the C3H/Km mouse RIF-1 sarcoma, and in tumor control studies with the C3H mouse MDAH/MCa4 carcinoma. Both SR drugs were capable of reaching hypoxic tumor cells, and the results of the tumor control studies indicated that these drugs were superior radiosensitizers to MIS when given at equitoxic doses. However, the test data showed a higher sensitizer enhancement ratio for SR-2508 than for SR-2555. Extrapolation from the mouse neurotoxicity data and from pharmacologic data on SR-2508 activity in spontaneous dog tumors suggested that SR-2508 levels 7.5x those of MIS can be achieved in human tumors for an equivalent neurotoxicity level. This should enable the max radiosensitization of hypoxic tumor cells to be obtained in conventional daily fractions. (20 Refs)

58. COMPARATIVE STUDIES ON THE RADIOSENSITIZING ACTION OF 4-NITROIMIDAZOL AND METRONIDAZOLE.

Magdon E, Schroder E
Zentralinstitut fur Krebsforschung, Akademie der Wissenschaften der DDR, Lindenberger Weg 80, 1115 Berlin-Buch, E. Germany
Arch Geschwulstforsch; 51(3):225-230 1981

The effects of 1-(2'-hydroxyethyl)-2-methyl-4-nitroimidazole (NIA) and 5-nitroimidazole (metronidazole) (MNA), alone and in combination with irradiation, on semiconservative DNA synthesis in vitro in L5178Y leukemia cells, on the reproductive capacity of V-79 Chinese hamster cells, and on the growth of mammary adenocarcinomas in C3H inbred mice were studied. Under toxic conditions neither chemical showed any significant effect. Under hypoxic conditions in combination with 60 Gray irradiation, NIA enhanced the inhibition of DNA synthesis compared with the effects of radiation alone. MNA had a similar, but lesser, effect. The reduction of the survival rate in V-79 cells by irradiation was not affected by NIA or MNA under oxic conditions. Under hypoxic conditions, both NIA and MNA (1 uM/ml culture medium) further reduced the survival rates by about the same amounts above the effects of irradiation. Growth of tumors in C3H mice was reduced by 40 Gray irradiation. A dose of 20 mg of either NIA or MNA combined with the irradiation further reduced tumor growth. Both chemicals had about the same effects. The results have significant implications for clinical applications in humans. (14 Refs) (In GER)

59. ACUTE TOXICITY AND RADIOPROTECTIVE EFFECTIVENESS OF WR-2721 (GAMMAPHOS) IN RATS.

Kuna P, Krajcovic C
Vojensky lekarsky vyzkumny a doskolovaci ustav J.E. Purkyne, 502 60 Hradec Kralove, Czechoslovakia
Cas Lek Cesk; 120(25):776-778 1981

The im and ip LD50 values for Gammaphos [WR-2721; thiophosphoric acid S-2-(3-aminopropylamino)ethyl ester] were found to be 441 and 463 mg/kg, respectively, in rats. Administered in doses of 150-250 mg/kg in 15 min before whole-body telecobalt irradiation (38.6-38.1 rads/min), Gammaphos reduced significantly the mortality of the rats during the first 30 days after irradiation. (8 Refs) (In CZE)

60. ENHANCEMENT OF THERMAL DAMAGE TO THE MICROCIRCULATION OF 'SANDWICH' TUMOURS BY ADDITIONAL TREATMENT.

Reinhold HS, Van den Berg-Blok A
Radiobiological Inst., TNO, Rijswijk, The Netherlands
Eur J Cancer Clin Oncol; 17(7):781-795 1981

The effects of hyperthermia on tumor microcirculation were investigated. For this purpose, transparent tumors were grown in the 'sandwich' system in the dorsal skin flap of the rat (Rhabdomyosarcoma BA1112 in WAG/Rij rats). Heating was performed with air; the temperature of the cover slip overlying the tumor was kept at either 42.5 C or 42 C by means of an electronic controller. Evaluation of the effect was based on microscopic observation and photographic recordings and was expressed as the proportion of tumors with intact microcirculation, ie, the proportion of tumors not showing heat damage. The results indicate that, at 42.5 C after a latent period of about 1 hr, the microcirculation of the tumors begins to slow down. At the end of a treatment time of 180 min, about 70% of the tumors show microcirculatory damage. It appears that some time is required before the majority of the tumors show heat damage. The effect is still essentially the same at 42 C, but the damage is to a much lesser extent. When the animals received additional treatment, ie, misonidazole, glucose or 5-thio-D-glucose, the damaging effect of the hyperthermic treatment at 42 C appeared to be increased. The effects of all combined treatments approximated the degree of inactivation obtained with 42.5 C treatment. (Author abstract) (44 Refs)

REVIEWS

61. INTRAOPERATIVE RADIOTHERAPY: THE JAPANESE EXPERIENCE.

Abe M, Takahashi M
Dept. Radiology, Faculty Medicine, Kyoto Univ., 606 Kyoto, Japan
Int J Radiat Oncol Biol Phys; 7(7):863-868 1981

Techniques and results of intraoperative radiotherapy (IOR) in 717 cases are reviewed. Gastric cancer was treated in 184 cases with a single radiation dose of 2,800-4,000 rad. Among 110 patients treated with surgery alone, survival rates were 93% for Stage I, 54.5% for Stage II, 36.8% for Stage III, and 0% for Stage IV. Among 84 treated by IOR, 5 yr survival rates were 88.1% for Stage I, 77.6% for Stage II, 44.6% for Stage III, and 19.5% for Stage IV. No serious complications were noted. Pancreatic cancer was treated in 108 cases with doses of 1,500-4,000 rad. Surgery and/or chemotherapy were used in some cases. Fifteen patients are alive, 5 after more than 1 yr. The greatest effect of treatment was relief of pain. Of 59 patients with biliary tract cancer treated with 2,500-4,000 rad in a single dose, 16 are still alive; the longest survival is 18 mo. Of 14 colon cancer cases treated, 5 are alive; one has survived more than 10 yr. IOR was indicated in brain tumors only after recurrence or in cases of glioblastoma. Of 36 patients treated 9 are alive. Bladder cancer was treated in 171 cases. In another series of 116 bladder cancer patients, IOR was followed by fractionated doses of external radiation which were given to prevent heterotropic recurrences in the bladder. Of 51 patients with lung cancer and 5 with mediastinal tumors treated with IOR, 4 and 6 are alive, respectively; 2/9 with mediastinal tumors have survived greater than 5 yr. A single dose of 3,500 rad was used in cases of prostate cancer. Of 26 patients 14 are still alive, 2 more than 5 yr and 3 more than 3 yr. Five of 27 patients with soft tissue sarcomas treated with IOR are alive after 5 yr. (20 Refs)

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Radiation Therapy

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BREAST NEOPLASMS

1. CHANGES IN PULMONARY BLOOD FLOW DURING THE DEVELOPMENT OF RADIATION PNEUMONITIS (MEETING ABSTRACT).

Prato FS
Nuclear Medicine Department, University of Western Ontario, London, Ontario, Canada
Long Term Normal Tissue Effects of Cancer Treatment, April 13-15, 1981, Bethesda, Maryland Committee for Radiation Oncology Studies; 1981

We studied patients with carcinoma of the breast since they received a standard course of radiotherapy which encompasses one lung apex. Regional lung function measurements related to ventilation and perfusion were performed along with global lung function measurements related to lung vol and blood gases. In addition clinical symptoms were recorded and radiographs semi-quantitatively evaluated. One group of 18 patients were studied once at x varying from 4 mo to 6.7 yr after the start of radiotherapy. Another group of 25 patients were studied prior to, and at various x up to 12 mo after the start of radiotherapy. In the first group, the functional parameter most affected by radiation was blood flow, and in some cases mild radiographic changes accompanied considerable reduction in blood flow. Results from the second group confirmed that blood flow was the parameter which showed the greatest change. Pulmonary vascular damage was apparent as early as 3 wk after the start of radiotherapy. The earliest apparent changes on the chest radiographs occurred after 2 mo as did changes in regional lung vol. No evidence of recovery was observed in the measured radiological and physiological changes. In fact the regional blood flow measured at 60 days after irradiation was predictive of blood flow measured at 300 days. The data suggests that early decreases in blood flow seen before the end of a protracted period of radiotherapy treatment may be predictive of more severe changes later on. (no Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

2. COMPUTERIZED TOMOGRAPHY (CT) AND DOSE OPTIMIZATION IN THE IRRADIATION OF BRAIN TUMORS (MEETING ABSTRACT).

Marks JE
Mallinckrodt Institute of Radiology, St. Louis, MO
The Symposium on Computed Tomography in Radiotherapy, September 18-19, 1981, Arlington, Virginia American Association of Physicists in Medicine; :F2 1981

Since 1974 the author has routinely used CT scans to plan optimum dose distributions in the irradiation of brain tumors. Dose optimization, or concentration of radiation in the tumor with relative sparing of surrounding brain, requires a CT scan to demonstrate the spatial relationship between tumor and surrounding brain, a high energy x-ray beam, 10 MeV or greater, and the ability to reconstruct the dose distribution onto the CT image. To establish a rationale for dose optimization the author reviews the known dose response information for glioblastoma multiforme and cerebral radionecrosis within the range of radiation doses most commonly used. Theoretically, dose optimization maximizes the effects of radiation on the tumor and reduces the chance of radiation injury to the surrounding brain. Practically, it is used to spare hair and reduce the incidence of radiation damage to cranial soft tissues. (no Refs)

3. PRELIMINARY RESULTS OF INTRACAVITARY IRRADIATION OF CYSTIC CRANIOPHARYNGIOMAS BY MEANS OF STEREOTACTICALLY APPLIED YTTRIUM-90.

Sturm V, Rommel T, Strauss L, Georgi P, Scheer KE, Steude U, Stock G, Penzholz H, Backlund EO
No affiliation given
Adv Neurosurg; (9):401-404 1981

Treatment of 10 cystic patients with craniopharyngiomas by intracavity high energy beta-irradiation of the cyst wall is described. Following stereotactic puncture of the center of the cyst, 1-2 ml of craniopharyngioma fluid was aspirated and replaced by Technetium-99 soln to determine the exact vol of the cyst. The amount of colloidal yttrium-90 necessary to irradiate every point of the inner surface of the cyst with 20,000 rad was injected into the cyst. The yttrium-90 instillation caused an arrest in the growth of 8/9 cysts in one group of patients. In the single patient in the second group, another small cyst developed from the tumor matrix 10 mo after treatment of the first cyst. (11 Refs)

4. TOLERANCE OF BRAIN TO MULTIPLE COURSES OF RADIATION THERAPY I. CLINICAL EXPERIENCES.

Dritschilo A, Bruckman JE, Cassady JR, Belli JA
Dept. Radiation Medicine, Georgetown Medical Center, Vincent T. Lombardi Cancer Res. Center, 3800 Reservoir Road, NW, Washington, DC, 20007
Br J Radiol; 54(645):782-786 1981

Patients with recurrent brain tumors yr after initial radiation therapy pose a difficult management decision. Should retreatment be performed with irradiation, which carries a risk of necrosis, or should retreatment be with less effective agents but without unnecessary risks? We present the results of retreatment of 32 patients at the Mayo Clinic and the Joint Center for Radiation Therapy. Clinical improvement was seen in all retreated patients. The median survival was 36 mo after completion of the second course of irradiation. Eight patients (25%) were alive, free of disease, from 22 to 315 mo after retreatment. Of the 11 patients alive at the time of analysis, 8 were experiencing productive lives and 3 were suffering from severe neurological damage. Evidence of brain necrosis was observed in two patients (6%); however, only 10/21 patients underwent autopsy examinations. Reirradiation of patients with late recurrences of brain tumors may offer neurological improvement and prolonged survival without excessive risk of necrosis. (Author abstract) (14 Refs)

5. EQUIVALENCE OF RADIATION SCHEDULES FOR THE PALLIATIVE TREATMENT OF BRAIN METASTASES IN PATIENTS WITH FAVORABLE PROGNOSIS.

Gelber RD, Larson M, Borgelt BB, Kramer S
Div. Biostatistics, Sidney Farber Cancer inst., 44 Binney St., Boston, MA, 02115
Cancer; 48(8):1749-1753 1981

Five whole-brain irradiation schedules ranging from 2,000 rad in 1 wk to 4,000 rad in 4 wk were evaluated in 1,830 patients with cerebral metastases treated in two randomized studies by the Radiation Therapy Oncology Group. The duration of palliative effectiveness among those patients with favora ble survival prognosis was investigated. Favorable subgroups were identified consisting of 123 ambulatory breast cancer patients with no soft tissue metastases, 373 ambulatory lung cancer patients with primary absent or no extracerebral metastases, and

65 ambulatory patients with other primaries and no extracerebral metastases. This group of 561 patients had a median survival of 28 wk compared with 11 wk for the remaining patients. Analyses of neurologic function control rates failed to show a significant benefit of higher doses. No advantage was demonstrated for treating brain metastases patients with favorable prognoses with more than 1 wk of whole-brain irradiation. (Author abstract) (10 Refs)

DIGESTIVE NEOPLASMS

6. INTERSTITIAL CURIETHERAPY IN THE TREATMENT OF ANORECTAL CARCINOMA.

Jackson BR
Dept. Surgery, Southern California Cancer Center, Los Angeles, CA
Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

Results of interstitial curietherapy and external irradiation treatment for anorectal neoplasms are reported. Patients consisted of a select group demonstrating one or more of the following: poor surgical risk, extensive primary or recurrent tumor, distant incurable metastasis, and refusal of surgery. Of 31 cases, 3 had primary rectal adenocarcinoma (PRA), 20 had recurrent rectal adenocarcinoma (RRA), and 8 had primary or recurrent anal canal carcinoma (ACC). Twenty-five patients were treated with a combination of external radiation and 192Ir implants utilizing a perineal template and afterloading technique (described in detail); four recurrent rectal adenocarcinoma patients also received permanent seed implants of 125I at laparotomy. One of three PRA patients (av age 84 yr) is alive with tumor; the remaining two died of unrelated causes. Of 20 RRA patients (av age 72 yr), 12 are alive, 7 with tumor and 5 with no evidence of disease; 8 have died, 5 due to tumor. In ACC cases (av age 65 yr), 5/8 have survived, 3 with tumor and 2 with no evidence of disease; 2/3 who died had tumor metastases. Complications included diarrhea with incontinence and stenosis or stricture (the most severe and appearing with approx equal distribution in the three groups), necrosis ranging from moderate to severe, rectovaginal fistula, and milder symptoms such as pain, induration, mucositis, and bleeding. The treatment method is thought to offer significant local control and effective palliation with an acceptable rate of complications in this select group of patients. (15 Refs)

7. RADIOTHERAPY FOR CANCER OF THE EXTRAHEPATIC BILE DUCT.

Department of Radiotherapy
Dept. Radiotherapy, Chinese PLA General Hosp., People's Republic of China
Zhonghua Zhongliu Zazhi; 3(1):61-64 1981

Cancer of the extrahepatic bile duct is rather rare among malignant tumors. Its prognosis is poor due to its ready invasion to adjacent vital organs such as the hepatic artery and pancreas. Surgical treatment has produced relatively short survival times while radiotherapy has shown promise as a preferred treatment modality. Treatment results are described for 14 cases (11 males, 3 females; aged 35-78 yr) in which 5 had been treated by radical surgery while 9 had been treated by biliary drainage or surgical exploration before radiotherapy. In this series, the av survival time for the radical surgery group was 9.4 mo while that for the biliary drainage or surgical exploration group was 13.8 mo. High dosage (greater than 4,000 rad) gave better survival times. Consequently it is suggested that a radiotherapy dosage of DT 65-70 GY (6,500-7,000 rad/7-9 wk) be used for radical treatment and a dosage of DT 40-50 GY (4,000-5,000 rad)/5-7 wk for palliative treatment. Treatment of complicating symptoms such as jaundice and radiation fields are discussed. (4 Refs) (In CHI)

8. THERAPY OF LOCALLY UNRESECTABLE PANCREATIC CARCINOMA: A RANDOMIZED COMPARISON OF HIGH DOSE (6000 RADS) RADIATION ALONE, MODERATE DOSE RADIATION (4000 RADS + 5-FLUOROURACIL), AND HIGH DOSE RADIATION + 5-FLUOROURACIL.

Moertel CG, Frytak S, Hahn RG, O'Connell MJ, Reitemeier RJ, Rubin J, Schutt AJ, Weiland LH, Childs DS, Holbrook MA, Lavin PT, Livstone E, Spiro H, Knowlton A, Kalser M, Barkin J, Lessner H, Mann-Kaplan R, Ramming K, Douglas HO, Thomas P, Nave H, Bateman J, Lokich J, Brooks J, Chaffey J, Corson JM, Zamcheck N, Novak JW
Mayo Clinic, Rochester, Mn, 55901
Cancer; 48(8):1705-1710 1981

One-hundred-ninety-four eligible and evaluable patients with histologically confirmed locally unresectable adenocarcinoma of the pancreas were randomly assigned to therapy with high-dose (6,000 rads) radiation therapy alone, to moderate-dose (4,000 rads) radiation plus 5-fluorouracil (5-FU), and to high-dose radiation plus 5-FU. Median survival with radiation alone was only 5-1/2 mo from date of diagnosis. Both 5-FU-containing treatment regimens produced a highly significant survival improvement when compared with radiation alone. Forty percent of patients treated with the combined regimens were still living at 1 yr compared with 10% of patients treated with radiation only. Survival differences between 4,000 rads plus 5-FU and 6,000 rads plus 5-FU were not significant with an overall median survival of ten mo. Significant prognostic variables, in addition to treatment, were pretreatment performance status and pretreatment CEA level. (Author abstract) (11 Refs)

GENITOURINARY NEOPLASMS

9. ENDORADIOTHERAPY FOR CANCER OF THE PROSTATE.

Hilaris BS, Whitmore W, Batata M
Dept. Radiation Therapy, Memorial Sloan-Kettering Cancer Center, New York, NY
Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

Between 1970 and 1977 357 patients with localized prostatic carcinoma were treated by 125I implantation of the prostate and bilateral retropubic pelvic lymph node dissection. Patient age ranged between 36 and 82 yr, av 61 yr; av time from diagnosis to treatment was 5.3 mo. Results are based on an analysis of 300 cases with at least 1 yr follow-up. Eligibility for treatment depended upon good health and no clinical, radiological, or biochemical evidence of metastasis. Forms used for pretreatment examination, surgical pathology findings, staging, and follow-up are presented. Conservative transurethral resection was performed in patients with symptomatic or endoscopic evidence of prostatic obstruction. A total of 283/300 patients are alive 1-8 yr from date of implantation; 5 yr survival is 83/83 for stage T1, 115/122 for T2, and 83/95 for T3. Incidence

of pelvic lymphadenopathy was 8% in T1, 46% in T2, and 55% in T3 tumors. Treatment failure was evident in 10%, the majority due to suboptimal dose distribution; 15% developed distant osseous metastases. Av time of appearance of first metastasis was 32 mo in T1, 16 mo in T2, and 20 mo in T3. Transient complications were experienced by 29 patients, and included dysuria, stress incontinence, leg or genital edema, rectal bleeding, persisting wound sinus, and hernia. No major urinary or bowel complications causing permanent functional disability were noted. Sexual impotency was reported in less than 10% of patients who were allegedly potent at initiation of treatment. (9 Refs)

10. RADIATION THERAPY FOR NONSEMINOMATOUS GERM CELL TUMORS OF THE TESTIS: A REAPPRAISAL.

Clements JC, McLeod DG, Weisbaum GS, Stutzman RE
Urology Service, Walter Reed Medical Center, Washington, D.C., 20012
J Urol; 126(4):490-492 1981

We analyzed the efficacy of radiation therapy and retroperitoneal lymphadenectomy preceded and followed by radiation therapy as curative treatment in 113 patients with clinical Stages I and II nonseminomatous germ cell tumors of the testis. Radiation therapy alone was curative in 86 and 82% of the patients with clinical Stages I and II disease, respectively, and radiation therapy before and after retroperitoneal lymphadenectomy was curative in 89 and 73% of patients with clinical Stages I and II disease, respectively. Of 26 patients with clinical Stage II disease in the group receiving radiation therapy before and after retroperitoneal lymphadenectomy only 13 (50%) had pathologic documentation of retroperitoneal metastasis or histologic evidence of nodal metastases that had been destroyed by radiation therapy alone. When analyzed by pathologic stage radiation therapy before and after retroperitoneal lymphadenectomy was curative in 91 and 51% of patients with Stages I and II disease, respectively. In our series clinical overstaging may have been responsible for the favorable results of radiation therapy alone, and radiation before and after retroperitoneal lymphadenectomy in the treatment of clinical Stage II nonseminomatous germ cell tumors. (Author abstract) (13 Refs)

11. MEGAVOLTAGE IRRADIATION FOR PURE TESTICULAR SEMINOMA: RESULTS AND PATTERNS OF FAILURE.

Dosoretz DE, Shipley WU, Blitzer PH, Gilbert S, Prat J, Parkhurst E, Wang CC
(c/o Shipley) Dept. Radiation Medicine, Massachusetts General Hosp., Boston, MA, 02114
Cancer; 48(10):2184-2190 1981

The survival, patterns, and mechanisms of failure in 171 patients with pure testicular seminoma treated with megavoltage irradiation from 1950 to 1976 were analyzed. The survival of the entire group was 93% at 5 and 10 yr post-irradiation. Survival at 5 yr was significantly less for Stages III and IV (45%) when compared with Stages I and II (95%, p less than 0.001). Extranodal relapses were more common in early stages, and abdominal recurrences occurred in more advanced stages. Salvage treatment, management of HCG-producing seminomas, and second testicular seminomas are analyzed. The need for aggressive and appropriate radiation technique is emphasized. (Author abstract) (24 Refs)

12. DISSEMINATED SEMINOMA: RE-EVALUATION OF TREATMENT PROTOCOLS.

Mendenhall WL, Williams SD, Einhorn LH, Donohue JP
Dept. Urology, Hematology-Oncology, Indiana Univ. Medical Center, Indianapolis, IN
J Urol; 126(4):493-496 1981

Radiotherapy provides a high cure rate for patients with Stages I and II seminoma but the results for those with Stage III disease have been disappointing. We report on 19 patients with high stage seminoma who have been treated with platinum, vinblastine and bleomycin (14 patients) or platinum, vinblastine, bleomycin and doxorubicin hydrochloride (5 patients). Of the 19 patients 12 (63%) had complete remission of the disease and the remaining 7 had partial remission. To date, 11 patients (58%) remain free of disease. Of the six patients with no prior irradiation five achieved complete remission, while the one failure had massive hepatic metastases. The median follow-up was 19 mo (range 12 to 37 mo). These results parallel that achieved with the same chemotherapy regimen in patients with stage III nonseminomatous testicular cancer. (Author abstract) (25 Refs)

GYNECOLOGIC NEOPLASMS

13. AN ANALYSIS OF THE SEVERE COMPLICATIONS OF IRRADIATION OF CARCINOMA OF THE UTERINE CERVIX: TREATMENT WITH INTRACAVITARY RADIUM AND PARAMETRIAL IRRADIATION.

Unal A, Hamberger AD, Seski JC, Fletcher GH
(c/o Hamberger) Dept. Radiotherapy, Univ. Texas System Cancer Center M. D. Anderson Hospital and Tumor Inst., Houston, TX, 77030
Int J Radiat Oncol Biol Phys; 7(8):999-1004 1981

The results of therapy administered, according to new guidelines for the combination of intracavitary radium and external beam irradiation, to 254 patients (200 Stage IB, 50 Stage II-A, and 4 Stage II-B) with carcinoma of the uterine cervix are described. Patients were treated with either intracavitary radium and parametrial irradiation or 2,000 rad whole pelvis irradiation followed by intracavitary radium and parametrial irradiation. At 4 yr, 85.8% of patients were alive with no evidence of disease; only 6.3% of patients died of disease. The central failure rate was very low (6/254) and there were no pelvic failures when the primary tumor was controlled. All 6 central failures occurred in patients with Stage IB tumors (5 squamous carcinomas and 1 adenocarcinoma). The overall incidence of complications for all 254 patients was 7.5%. All complications occurred within 36 mo following treatment, except in one patient who developed small bowel obstruction 10 yr after irradiation. A correlation was observed between the incidence of complications and the amount of irradiation delivered. Complications (12 small bowel obstructions, 16 hydroureter hydronephrosis, 14 sigmoiditis, and 6 fistulae) were associated with a high number of mg hr of radium plus a high dose of external irradiation, in combination with either asymmetry of the radium system and/or history of previous pelvic inflammatory disease, pelvic surgery, or diverticulosis. (6 Refs)

14. HYPERBARIC OXYGEN THERAPY FOR CARCINOMA OF THE CERVIX: STAGES IIB LESS THAN IIIA, IIIB AND IVA: RESULTS OF A RANDOMIZED STUDY BY THE RADIATION THERAPY ONCOLOGY GROUP.

Brady LW, Plenk HP, Hanley JA, Glassburn JR, Kramer S, Parker RG

Dept. Radiation Therapy-MS200, Hahnemann Medical Coll. and Hosp., 230 North Broad St., Philadelphia, PA, 19102

Int J Radiat Oncol Biol Phys; 7(8):991-998 1981

Optimal schedules using hyperbaric oxygen were compared with conventional treatment schedules of known value in the treatment of cervix carcinoma. Sixty-five stage IIB, IIIA, IIIB, and IVA patients were randomized to receive treatment either in air or in the hyperbaric chamber under three atmospheres of pressure. Of the 65 patients, 7 could not be evaluated. Of the 29 patients 'randomized to air,' 27 followed the prescribed course of external and intracavitary radiation. Only 19/29 patients 'randomized to hyperbaric oxygen' received all or most of the external treatment in oxygen. Over 90% of the patients were followed for 4 yr, 48/58 for 5 yr or more. In the Stage IIB group, only 1/9 local recurrences was found in the oxygen-treated group; 4/19 patients treated in air had local recurrences. Fifteen of the 29 air-treated and 14/19 oxygen-treated patients, including those living and those who had died of intercurrent disease or complications, showed no evidence of disease. Seven patients in each group of 29 patients developed complications. The results indicated no significant difference in survival between air-treated and oxygen-treated groups. The local tumor control rate was slightly better in those patients actually treated with oxygen but the number of patients with any element of failure was almost the same (24% in air and 26% in oxygen). (16 Refs)

15. THE ROLE OF BRACHYTHERAPY IN THE TREATMENT OF PRIMARY CARCINOMA OF THE VAGINA AND FEMALE URETHRA.

Delclos L, Wharton JT, Fletcher GH, Rutledge FN

Dept. Radiotherapy, Univ. Texas Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX

Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

Treatment techniques for carcinoma in situ, squamous cell carcinoma of the vagina, adenocarcinoma of the vagina, and carcinoma of the female urethra are detailed. Previously published data for (1) primary carcinoma (99 squamous cell and 8 adenocarcinoma) of the vagina treated by irradiation (1948-1972), (2) clear cell adenocarcinoma of the vagina in young (1.5 to greater than 5 yr) females (1965-1976), and (3) carcinoma of the female urethra treated by irradiation (1948-1972) are presented. Epithelial tumors of the vagina and urethra can apparently be treated by external transvaginal, intracavitary, and interstitial irradiation with some success, regardless of age or stage and without the loss of vaginal function. (7 Refs)

HEAD AND NECK NEOPLASMS

16. SIMULTANEOUS BILATERAL RADIATION FOR ADVANCED BILATERAL RETINOBLASTOMA.

Abramson DH, Ellsworth RM, Tretter P, Adams K, Kitchin FD
New York Hosp.-Cornell Medical Center, 70 East 66th St., New York, NY, 10021

Arch Ophthalmol; 99(10):1763-1766 1981

A retrospective review of 1,424 cases of retinoblastoma disclosed 34 patients with advanced bilateral retinoblastoma whose sole initial treatment was simultaneous bilateral radiation. All patients had a combination of bilateral group IV or V retinoblastoma. Mean age at diagnosis was 13.1 mo. Five-yr survival of patients was 88% (28/32). In 2 (7%) of 28 surviving patients, a second nonocular tumor developed: one inside and one outside the field of radiation. Of the 64 eyes treated, 44 ultimately were enucleated. Of 10 eyes requiring a second course of radiation, 9 were enucleated. In only one eye was enucleation due to radiation complications. Eleven patients required additional treatment with light coagulation, cryopexy, or cobalt plaques. (Author abstract) (9 Refs)

17. TRANSPARENT PLASTIC REPLICAS OF COBALT-60 APPLICATORS FOR THE MANAGEMENT OF CHOROID TUMORS.

Gonzalez MO, Drouilhet JH, Ruiz RS, Cundiff JH
Dept. Radiation Therapy, M. D. Anderson Hosp., Univ. Texas System Cancer Center, 1203 Sterling Ave., Houston, TX, 77030

Radiology; 141(2):545 1981

Transparent plastic replicas of active cobalt applicators were designed for use in precisely determining the area to be subsequently covered by the radioactive plaque used to treat choroidal tumors. Decreased exposure to the operator and more accurate placement of the plaque results. (Author abstract) (7 Refs)

18. THE EFFECTS OF RADIATION ON PAROTID SALIVARY FUNCTION.

Marks JE, Davis CC, Gottsman VL, Purdy JE, Lee F
Div. Radiation Oncology, 4511 Forest Park, 311, St. Louis, MO, 63108

Int J Radiat Oncol Biol Phys; 7(8):1013-1019 1981

Radiation dose was correlated with late measurement of salivary flow, pH, and secretory IgA (SIgA) in patients with head and neck cancer who had received a wide range of radiation doses. Group I consisted of 15 age-matched controls (9 men, 6 women; 48-67 yr old) without head and neck cancer whose parotids had not been irradiated. Group II consisted of 17 patients (13 men, 4 women, 32-81 yr old) with cancers of the nasopharynx, oropharynx, and oral cavity who had bilateral parotid photon beam irradiation. Group III consisted of 12 patients (5 men, 7 women; 38-79 yr old) with cancers of the parotid, skin, and oral cavity who had unilateral electron beam radiation. Mean salivary flow in ml/15 min was 2.87 for 30 control parotids, 1.55 for 12 contralateral parotids in Group III, and 0.11 for the 34 parotids in Group II. A progressive reduction in salivary flow was observed with increasing radiation dose. At higher radiation doses, fewer parotids secreted measurable quantities of saliva. Mean salivary pH was 7.33 for control parotids, 7.32 for 10 Group III contralateral parotids with measurable saliva, and 7.0 for 6 Group II with measurable saliva. A general reduction of saliva pH was observed at higher radiation doses. Mean SIgA in mg/deciliter was 5.67 for

controls, 10.91 for contralateral parotids in Group III with measurable saliva, and 7.2 for 6 parotids in Group II with measurable saliva. SIgA increased at low dose levels and than progressively decreased at higher radiation doses. None of the Group I, all of Group II, and approx 1/2 of Group III patients complained of dry mouth. (17 Refs)

19. THE ROLE OF RADIOTHERAPY IN GREATER SALIVARY GLAND CANCER (MEETING ABSTRACT).

Fujita M, Nishiyama J, Ikeda H, Masaki N, Shigematsu Y
Dept. Radiology, Medical Sch., Osaka Univ., Kita-ku, Osaka 530, Japan
Program and Preprints of the 5th Annual Congress of Japan Society of Head and Neck Tumor held in Osaka, Japan, 29-30 May, 1981. Japan Society of Head and Neck Tumor, Chiba 280, Japan, 109 pp., 1981.

The site of the lesion of 77 patients with cancer of the greater salivary gland who had received radiotherapy at this facility between 1967 and 1979 was the parotid gland for 54 patients, su bmaxillary gland for 20 and sublingual gland for 3. Histologically, there were 22 adenocarcinomas, 18 mucoepidermoid carcinomas, 12 adenoid cystic carcinomas, 7 squamous cell carcinomas and 18 others. Postoperative irradiation was given to 34 patients (Group A), radiotherapy alone to 38 patients (Group B) and preoperative irradiation to 5 patients (Group C). Patients with inoperable advanced cancer and those who received radiotherapy after postoperative relapse were included in Group B. The 5-yr cumulative survival rate was 65%, 78%, and 54% for the patients with adenocarcinoma, mucoepidermoid carcinoma and adenoid cystic carcinoma, respectively. The 5-yr survival rate for the Group A patients was about 60%, but that for the patients whose remaining tumors could no longer be detected and for those whose remaining tumors were detected by the postoperative findings were about 75% and about 50%, respectively. The 5-yr survival rate for the patients with no lymph node metastasis was about 90%, whereas that for the patients with metastasis was about 45%. The 5-yr survival rate for the patients who had only surgery and for those who had only radiotherapy were both lower than that (about 60%) of the patients who had a combination of the two. (no Refs) (In JPN)

20. MINOR SALIVARY GLAND CARCINOMAS OF THE MOUTH AND OROPHARYNX.

Gregor RT, Heng BB
P.O. Box 781346, Sandton 2146, South Africa
J Otolaryngol; 10(4):267-272 1981

Of 170 cases of malignancies of the mouth and oropharynx treated during a 24 yr period, 16 were carcinomas of the minor salivary glands. The most common sites were the palate (10 cases) and the tongue (3 cases). Patient ages ranged from 25 to 83 yr with an av of 50.9 yr. Men and women were affected equally. Symptoms included pain (8 cases) and detectable mass. Av duration of symptoms was 13.6 mo prior to presentation. Six patients underwent surgery as the initial curative treatment. Of these, three are alive after 4-10 yr. Five received radiotherapy as initial treatment. Three of these are alive without recurrence 6 mo-12 yr after treatment. Four patients had combined surgery and radiation treatment. Two given preoperative radiation developed tumor recurrence. Two given postoperative radiation are disease-free after 6 and 10 yr. Tumors recurred in 7/16 cases within 2-7 yr after treatment. Combined surgery and high-dose (greater than 6,700 rads) radiation therapy appeared to produce the best results. (4 Refs)

21. ANALYSIS OF TIME-DOSE FACTORS IN SQUAMOUS CELL CARCINOMA OF THE ORAL TONGUE AND FLOOR OF MOUTH TREATED WITH RADIATION THERAPY ALONE.

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Div. Radiation Therapy, Hillis Miller Health Center, Box J-385, Gainesville, FL, 32610
Int J Radiat Oncol Biol Phys; 7(8):1005-1011 1981

The effect of external beam radiation, used to treat both the primary lesions (7 4 squamous cell carcinomas of the tongue and 73 squamous cell carcinomas of the floor of the mouth) and the neck, on local control was examined. Time-dose factors for combining external beam and interstitial radium that produce local control equivalent to radium alone were studied. For the 74 patients with tongue tumors, a significantly better rate of control was observed for T2 lesions treated with a greater proportion of radium. A time-dose relationship was noted in T2 and T3 lesions of the tongue. Local control increased with shorter treatment times over the range of doses administered for the T2 lesions. The local control rate increased with increasing dose and with decreasing overall treatment time in the T3 lesions. For both T2 and T3 patients, no apparent difference in local control was observed between split-course and continuous-course treatment within time-dose subgroups. No significant difference in local control was observed for T1 and T2 tumors of the floor of the mouth as a function of treatment schedule. There was an increased local control rate in the T3 lesions treated with radium plus more than 3,000 rad external beam as compared to external beam alone. A time-dose relationship was noted in the T3 lesions of the floor of the mouth. In T3 patients, dose appeared to be more important than time. Thirty-two of 33 patients with elective neck irradiation had no neck node recurrence versus 13/17 patients without neck irradiation. Treatment complications and patient survival are described. Whereas dose appears to be important in all of these groups, overall treatment time appears to influence local control of oral tongue lesions more than mouth lesions. (26 Refs)

22. EXTERNAL IRRADIATION COMBINED WITH INTERSTITIAL BRACHYTHERAPY FOR CARCINOMA OF THE TONGUE.

Yamashita T, Sugimoto T, Takayama M, Kanehira C, Kubota S, Ikenouchi J, Gomi M, Mochizuki S
Dept. Radiology, Jikei Univ. Sch. Medicine, Tokyo, Japan
Gan No Rinsho; 27(11):1318-1322 1981

Combination of external x-irradiation and interstitial brachytherapy was evaluated as therapy for 22 cases of squamous cell carcinoma of the tongue (6 cases of T1, 10 of T2, 5 of T3, and 1 of T4; 16 of N0, 4 of N1, and 2 of N2). External x-rays were delivered with a 6 megavolt linac x-ray apparatus via a 2-portal approach from the right and left opposing fields after immobilizing the lower part of the tongue. T1 tumor patients were administered 2,000 rads/2 wk, and the T2 and T3 patients were administered 3,000 rads/3 wk. Interstitial brachytherapy was administer after a 7-day rest period in the T1 patients and after a 14-day rest period in the T2 and T3 patients; the total dose of interstitial radiation as calculated by the Paterson-Parker method was 4,500-7,000 rads/4-7 days. Bleomycin was administered to 12/22 patients. Local control was observed in 6/6 T1 cases, 8/10 T2, 0/5 T3, and 0/1 T4. No relationship was observed between the total combined doses of radiation and local control rate. It was considered as necessary the interstitial brachytherapy performed in the region of the tumor that existed prior to external irradiation. Bleomycin had no effect

on the rate of metastasis or on inhibition of the primary tumor at the time of external irradiation. (14 Refs) (In JPN)

23. RESULTS OF TREATMENT OF INTRAORAL CARCINOMA BY 192IR HAIRPIN TECHNIQUE COMPARED WITH TREATMENT BY RADIUM NEEDLES.

Shigematsu Y, Masaki N, Inoue T, Miyata Y, Ikeda H, Tanaka Y, Hayami A, Ozeki S

Dept. Radiology, Osaka Univ. Hosp., Osaka, Japan

Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

During the period 1974-1977, 60% of intraoral cancer cases were carcinoma of the tongue. Results of treatment of these cases by either 192Ir wire/ hairpin or 226Ra needle interstitial implantation are presented. 192Ir was supplied in six sets every 4 mo; the hairpin (44 mm long) was used for the larger lesions over longer intervals. The treatment program for different stages consisted of: interstitial radiotherapy (electron beam using cone guide) for T1N0, external radiotherapy (3,000 rad/ 2-2.5 wk) with interstitial radiotherapy for T2N0, external radiotherapy, interstitial radiotherapy, and radical neck dissection for T2N+, and individualized therapy (mainly external beam) for T3Nx. Of 233 patients, 132 were treated by Ir and 121 received Ra. Delivered dose was 6500-7500 rad minimum. Two-yr local control rates by stage were (T1) 95% for both Ir and Ra, (T2) 70% for Ir and 76% for Ra, and (T3) less than 50% for Ir and approx 65% for Ra. Differences were not significant. Av staff exposure in the Ir group was approx 1/3 that in the Ra group at every body site tested. 192Ir may be a good substitute for Ra. (5 Refs)

24. THE PREVENTION OF POST-RADIOTHERAPEUTIC DENTAL CARIES AND OSTEORADIONECROSIS IN OTORHINOLARYNGOLOGICAL AND MAXILLO-FACIAL CANCEROLOGY.

Bolla M, Raphael B, Lebeau J, Brunel JP, Vrousos C, Roux O, Junien-Lavillauroy C

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J Fr Otorhinolaryngol; 30(7):455-459 1981

The prevention of radiotherapy-induced odontonecrosis and osteonecrosis in patients with maxillo-facial tumors is described. The effect of radiation is both direct and indirect. Direct irradiation of the teeth is usually kept to a minimum. Secondarily, effects of radiation on the salivary glands greatly affects dental hygiene. Hyposialosis, along with increased viscosity and decreased pH of the saliva increases the probability of dental caries. Signs of such disorders include an alteration of the neck of the tooth which is in contact with the cement, abnormalities of dental surfaces exposed to saliva, and brownish coloration of the teeth. Osteoradionecrosis occurs most often in the lower maxilla. In an attempt to prevent radiation-related disorders of the teeth prophylactic fluoride therapy was administered to patients with good dental hygiene along with good psychological and odontologic status. The surgical extraction, fluorination technic, odontologic follow-up, and prosthetic restoration are described. The results of daily fluoride treatment and tooth preservation in 432/1,409 undergoing radiotherapy are described. The efficacy of this fluoride treatment is discussed. (6 Refs) (In FRE)

25. PROBLEMS OF RADIATION THERAPY IN SKIN TUMORS IN FACIAL FOLDS.

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Hautarzt; 32(10):529-531 1981

Recidivism was studied in 405 cases of skin tumors treated by radiation therapy. Tumors were located on the bridge, wings, root, or tip of the nose, on folds around the eyes, or in nasal-lip folds. T1 tumors accounted for 228 cases; T2 tumors accounted for 177 cases. Patients received doses of 5.34 gray (600 R in 9 or 10 fractions within 12 days), 8.80 gray (1,000 R in 4-6 fractions within 5-8 days), or 26.7 gray (3,000 R, single dose). Among 228 T1 tumors the recidivism rate was significantly higher for tumors of the root (15.8%) and tip (14.3%) of the nose than for tumors in other locations (3.3-6.7%). One factor in differing rates was falsely diagnosed tumor depth. This was due to difficulties in measuring tumors in different locations. A second factor was inhomogeneity of radiation dose distribution. As little as 1 mm change in distance between radiation source and tumor created a significant under- or overdosing. Tests with solid phantoms and with film showed that tilting the radiation source as little as 15 degrees produced significant changes in the distribution of the dose. (14 Refs) (In GER)

26. THE MANAGEMENT OF SQUAMOUS CELL CARCINOMA IN CERVICAL LYMPH NODES IN THE CLINICAL ABSENCE OF A PRIMARY LESION BY COMBINED SURGERY AND IRRADIATION.

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Cancer; 48(8):1746-1748 1981

Sixty-three patients who had either previously treated primary tumors or unknown primary tumors and developed metastatic cervical adenopathy in their previous untreated necks received the combination of surgery and megavoltage irradiation. Within 2 yr, 12 patients died of intercurrent disease, 9 patients died with distant metastases only, and 5 patients had disease recur at a primary site. The remaining 37 patients were evaluable for control of neck disease; 26 patients had previous treatment to a primary hea d and neck cancer that was under control at the time cervical adenopathy was treated; and 11 patients had an unknown primary tumor that was believed to be in the head and neck area. The combination of pre- or postoperative irradiation and surgery controlled neck disease in 86% of the evaluable patients. Because of the extent of neck disease, these patients would have been at a high risk of failure in the treated area if only a single modality of treatment were used. Analysis of the data shows an association of extranodal connective tissue involvement with both a decreased rate of control within the treated area and distant metastases. (Author abstract) (6 Refs)

27. MANAGEMENT OF STAGE II GLOTTIC CANCER.

Jose B, Mohammed A, Calhoun DL, Tobin DA, Scott RM

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Int J Radiat Oncol Biol Phys; 7(8):1021-1024 1981

The treatment of 55 patients (50 men, 5 women; most between 55 and 74 yr old) with early glottic cancer was analyzed retrospectively. All 55 patients received radiotherapy as pri-

mary treatment. The adjusted 5-yr survival rate was 81%. Of the 55 patients, 15 had local failures, either resulting from residual or recurrent disease. These failures were managed by surgery or radiation therapy. The median time to local failure was 11 mo. Fifty-eight% (7/12) of the patients who failed were salvaged by surgery. The overall local control was 85% (47/55). There were no cases of laryngeal necrosis observed. The occasional edema in the larynx and post-radiotherapy hoarseness were controlled in about 3 mo with antibiotics and sufficient voice rest. Eight patients developed second cancers on follow-up. No second cancer of the larynx was reported. A brief review of the literature is presented. (9 Refs)

28. PERCUTANEOUS RADIOTHERAPY OF THYROID CARCINOMA.

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Strahlentherapeutische Universitatsklinik Koln, Josef-Stelzmann-Strasse 9, D-5000 Koln 41, W. Germany

MMW; 123(37):1357-1359 1981

Percutaneous radiotherapy of thyroid carcinoma is reviewed. Postoperative irradiation of the neck is recommended in all patients with papillary and follicular carcinoma in Stages T2-3N0M0 and higher. The lymph nodes behind the sternoclavicular region and at the mastoid should be included in the irradiated field. The total dose is 5,000 rads in 5 wk. Percutaneous radiotherapy can reduce the frequency of locoregional recurrences in inoperable patients and in patients not undergoing radical surgery, in which case it should be employed together with radioiodine. Although thyroidectomy is the treatment of choice in medullary carcinoma, these tumors also respond well to radiotherapy (5,000 rads in 5 wk). Radiotherapy is always indicated, if the tumor is not removed. Radiotherapy is the treatment of choice for undifferentiat ed carcinoma, because total surgical removal of the tumor is rarely possible, and partial resection is of little value. A 5-yr survival rate of 20% was reported for small-cell undifferentiated carcinoma. In operable patients with large-cell anaplastic carcinoma, surgery should be the primary treatment followed by percutaneous radiotherapy and chemotherapy. The primary tumor, cervical lymph nodes, and mediastinum should be irradiated (6,000 rads in 6-8 wk). (21 Refs) (In GER)

29. RADIATION THERAPY IN THE MANAGEMENT OF MALIGNANT THYMIC TUMORS.

Arriagada R, Gerard-Marchant R, Tubiana M, Amiel JL, Hajj L

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Acta Radiol Oncol Radiat Phys Biol; 20(3):167-172 1981

A review of 20 patients with malignant thymic tumors is presented. A simplified classification is used avoiding the term thymoma, which is considered misleading. Most of the patients were treated by a combination of surgery and radiation therapy while seven were treated by irradiation alone. Postoperative radiation therapy is indicated when the tumor is incompletely removed. This is also advised in invasive tumors even when they are considered completely resected. Irradiation alone of inoperable tumors should be carried out with high doses (55 to 60 Gy) to decrease the risk of local recurrence. (Author abstract) (28 Refs)

30. RESULTS OF FAST NEUTRON TELETHERAPY FOR LOCALLY ADVANCED HEAD AND NECK TUMORS.

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Int J Radiat Oncol Biol Phys; 7(8):1045-1050 1981

Seventy patients with locally advanced tumors of the head and neck region were treated with fast neutron teletherapy. All patients were irradiated 5 x per wk. The minimal tumor dose varied between 18 Gray (Gy) Gyngamma (Gyngamma = neutron dose + gamma dose) and 24 Gyngamma. Of the 70 patients, only 52 were evaluable. The minimum follow-up from the start of treatment was 2 yr. In general, only patients with less than a 10% chance of 5 yr survival with conventional therapy were included in the study. Although most patients had T3 and T4 tumors, nine patients with T2 tumors were treated. Two of them had recurrent tumor after previous major surgery and died of tumor after 1.5 and 13 mo, respectively. Four patients were judged unfit for surgery and were locally controlled but died of intercurrent disease after 5, 9, 13, and 17 mo. Three patients had T2 tumors of the larynx combined with cervical adenopathy. They died after 8, 20, and 33 mo of metastases and intercurrent disease. In most of the 43 patients with T and T4 lesions, persisting control of the primary tumor was achieved with the exception of tumors in the anterior two-thirds of the tongue (9 failures out of 11 patients). Persisting tumor in cervical nodes was found in 7/25 patients. Control rate is discussed in terms of site. Complete tumor regression was observed in 9/11 patients with salivary tumors. Only one failure was observed among six patients with tumors at the base of the tongue. Except for some salivary gland tumors, the histology of the analyzed head and neck lesions was squamous cell carcinoma. No difference in prognosis or local cure was found with different histological grading of the tumor. Complications of this treatment are described. (23 Refs)

31. SYSTEMATIC DENTAL MANAGEMENT IN HEAD AND NECK IRRADIATION.

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Int J Radiat Oncol Biol Phys; 7(8):1025-1029 1981

The correct application of principles of dental management for 528 head and neck cancer patients treated with irradiation is described. Management included careful dental evaluation and pre-therapeutic dental care (cleaning of existing teeth, application of fluoride gel, polishing and elimination of irritating spicules, filling of superficial caries, and where indicated, restoration of teeth). Extraction of teeth that are fractured, have deep caries, or severe periodontal disease, especially if they are in the direct radiation beam may be required. Together with daily topical fluoride application, the patient must maintain oral cavity dental hygiene by careful daily brushing using careful technics to clean all teeth surfaces. Post-irradiation extractions may be required for teeth which do not have proper occlusion, those in risk of being destroyed by periapical infection, those with advancing periodontal disease, or those by which severe soft tissue irritation may be caused. Of 528 patients, only 22 patients required post-irradiation extraction. Using these principles, only 16/528 patients developed radiation caries. Of 528 patients, 208 had significant irradiation to 40% or more of the oral cavity and were at high risk for development of osteoradionecrosis. However, only four patients developed osteoradionecrosis. Over 85% of patients who subse-

quently received a dental prosthesis had excellent tolerance without pain or mucosal irritation. The results indicated that dental and mandibular post-irradiation problems can virtually be eliminated with proper care. (13 Refs)

32. COMPLICATIONS OF POSTOPERATIVE AND PREOPERATIVE RADIATION THERAPY IN HEAD AND NECK CANCERS. A COMPARATIVE STUDY.

Mantravadi RV, Skolnik EM, Applebaum EL
Dept. Radiology, Univ. Illinois Hosp., Post Office Box 6998, Chicago, IL, 60680
Arch Otolaryngol; 107(11):690-693 1981

The complications of planned postoperative irradiation in 60 consecutive patients treated between 1975 and 1979 are compared with those seen in 92 patients treated with preoperative irradiation between 1968 and 1974. The overall rate of complications requiring additional hospitalization was 15% (9 patients) in the postoperative radiotherapy group as compared with 54% (50 patients) in the preoperative radiotherapy group. A statistically significant increase in acute complications was noted in the latter group (46 vs 3, 50% vs 5%). Delayed complications occurred with similar frequency in both groups. The 3-yr survival was comparable between similar patients of each group treated with either of the two modalities. We favor postoperative irradiation because of decreased acute complications and comparable survival. Modifications of the treatment technique are suggested to minimize the overall rate of complications. (Author abstract) (15 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

33. THE PLACE OF RADIOTHERAPY IN THE MANAGEMENT OF LOCALISED HODGKIN'S DISEASE (REPORT NO 11).

Hope-Stone HF
(c/o G. Hudson) Dept. Oncology, Middlesex Hosp., London, W1, England
Clin Radiol; 32(5):519-526 1981

This report reviews the experience of the BNLI in managing localized Hodgkin's disease, since the BNLI began in February 1970. The original problem investigated by this study was the evaluation of 'prophylactic' irradiation treating adjacent apparently unaffected regions, as opposed to radiation directed to only the affected regions of the body. Because lower half Hodgkin's disease is uncommon, the study was confined to patients presenting with upper half disease, with 'B' symptoms. Diagnostic laparotomy and splenectomy was not considered to be a mandatory investigation and at the commencement of the study was recommended by only two collaborators. By the completion of the study the majority of collaborators were recommending this procedure routinely. This study therefore includes two additional subgroups of patients with Stages I, IIA (upper half) Hodgkin's disease. In the laparotomized group of patients a 10-yr survival rate of almost 95% with either 'local' or 'prophylactic' irradiation suggests that wide field irradiation (including total nodal irradiation) is not essential in the cure of apparently localized Stages I, IIA (upper half) Hodgkin's disease, provided the extent of the disease has been accurately determined by previous investigation. In those patients treated with strictly localized (as opposed to 'prophylactic') irradiation, relapses in adjacent unirradiated regions have been completely controlled by additional treatment, usually irradiation, and none have died of Hodgkin's disease. (Author abstract) (11 Refs)

34. RADIOTHERAPY OR CHEMOTHERAPY AS THE INITIAL TREATMENT FOR STAGE IIIA HODGKIN'S DISEASE (REPORT NO 13).

Strickland P
(c/o G. Hudson) Dept. Oncology, Middlesex Hosp., London, W1, England
Clin Radiol; 32(5):527-530 1981

This report describes three comparative studies of treatment methods in patients with Stage IIIA Hodgkin's disease in whom the extent of disease had been confirmed by a diagnostic laparotomy. The first trial (1970-75) compared TNI with MOPP. The recurrence-free survival curve for patients treated with TNI was significantly better than that for those treated with MOPP at 4 yr, but the survival rate of the two cohorts was identical, presumably because of good salvage treatment. The second study (1975-80) compared TNI with TNI followed by LOPP. Initially the addition of LOPP appeared to improve the disease-free survival rate but at 3 yr no difference was apparent between the two treatment groups. The third (1980-present) study divides patients into those with and those without splenic involvement. Retrospective analysis of all patients included in the BNLI with Stage IIIA Hodgkin's disease confirmed by laparotomy and treated initially by TNI shows that splenic involvement does not influence the survival but decreases the relapse-free survival rate, making additional treatment with MOPP necessary in 75% of long-term survivors. In the current study, patients without splenic involvement are treated with TNI whereas those with splenic involvement are treated initially with chemotherapy, randomizing between MOPP and LOPP. (Author abstract) (4 Refs)

35. SECOND-LINE TREATMENT OF MALIGNANT LYMPHOMA.

Joss R, Brunner K
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Ther Umsch; 38(9):904-911 1981

The secondary therapy of recurrent malignant lymphoma is reviewed. In recurrence of Hodgkin's disease (HD) in a previously nonirradiated region, repeated radiotherapy should be considered. Recurrences in more advanced stages require polychemotherapy. Polychemotherapy and low-dose irradiation are indicated for recurrences in previously irradiated regions. Cytostatic therapy is indicated in the case of recurrence after previous chemotherapy with or without additional radiotherapy. Chemotherapy with non-cross-resistant drugs is needed in the case of primary chemotherapy failure and early recurrence. Radiotherapy can have good palliative effect in recurrence after chemotherapy. Complete tumor remission can be achieved in HD patients developing recurrence after chemotherapy, but the results of secondary therapy are poor in the case of primary therapy failure and early recurrence. In prognostically favorable cases of non-Hodgkin's lymphoma (NHL), chemotherapy is resumed in the case of recurrence, but more aggressive chemotherapy may be required because of the possible transformation into a more aggressive form. In prognostically unfavorable forms, secondary chemotherapy with non-cross-resistant drugs should be given in cases of early recurrence and primary therapy failure, while late recurrence calls

for repeated induction chemotherapy with the same drugs. (31 Refs) (In GER)

36. RADIOTHERAPY OF MALIGNANT LYMPHOMA.

Greiner R, Veraguth P
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Ther Umsch; 38(9):881-892 1981

Radiotherapy of Hodgkin's disease (HD) and non-Hodgkin's lymphoma (NHL) is reviewed. Primary exclusive radiotherapy is the method of choice in the treatment of Stage IA and IIA HD, especially according to extended-field technique. The 10-yr survival rate is about 80%. Total nodal irradiation is recommended for Stages IB and IIB of HD. Primary exclusive radiotherapy is indicated for Stage IIIA as well, because no significant differences were found in the 8-yr survival rate and recurrence-free survival rate between exclusive radiotherapy and radiotherapy with adjuvant polychemotherapy. Involved-field irradiation with low doses is recommended for Stage IIIB. The total dose necessary in HD is 4,000-4,400 rads in 4-5 wk, and 4,400-5,000 rads for larger tumor vol and protracted treatment. In NHL, primary or exclusive radiotherapy is indicated only in the case of locoregional stages (I, IE, II, and IIE). (117 Refs) (In GER)

37. A PROSPECTIVE COMPARISON OF COMBINATION CHEMOTHERAPY WITH TOTAL BODY IRRADIATION IN THE TREATMENT OF ADVANCED NON-HODGKIN'S LYMPHOMA.

British National Lymphoma Investigation Report
(c/o A. M. Jelliffe) Dept. Oncology, Middlesex Hosp., Mortimer St., Third Floor, Jules Thorn Building, London W1, England
Clin Oncol; 7(3):193-200 1981

A prospective comparison has been conducted of combination chemotherapy (CHOP) and total body irradiation (TBI) in the treatment of patients with generalized non-Hodgkin's lymphoma of poor histological grade. Neither form of therapy has proved to be satisfactory as only 39% of patients developed complete remission with CHOP and 23% of patients with TBI. In addition 55% of those patients treated with CHOP and 73% of those receiving TBI have died within 53 mo. There is a statistically significant difference between the survival curves in favor of CHOP when patient survival is stratified for Stage III disease ($x2 = 4.125$: 0.05 greater than p greater than 0.025). There is no evidence that those patients who remain relapse-free after 4 yr have one histological subtype of these Grade II tumors. (Author abstract) (13 Refs)

38. WHOLE BODY IRRADIATION IN NON-HODGKIN'S LYMPHOMA (MEETING ABSTRACT).

Bullimore JA
Radiotherapy Centre, Bristol Royal Infirmary, Bristol, England
Br J Radiol; 54(640):371 1981

Twenty-six patients with non-Hodgkin's lymphoma, unresponsive to or in relapse following chemotherapy, received total-body irradiation (TBI) to a dose of 150 centiGray (rad) in 15 fractions over 18 days. A response was achieved with 17 patients, in six of whom it was complete. The actu arial survival rates were 50% at one yr and 42% at 30 mo. Best results were achieved in those with low-grade histology and in those under 60 yr of age. Transient marrow toxicity was the only significant side-effect of treatment; although it was usually severe, there were no serious sequelae. TBI should be considered as a secondary therapy in non-Hodgkin's lymphoma, regardless of previous treatment. (no Refs)

39. TOTAL-BODY IRRADIATION IN ADVANCED NON-HODGKIN'S LYMPHOMA (MEETING ABSTRACT).

Dobbs HJ
Department of Radiotherapy, Royal Marsden Hospital, Sutton, Surrey SM2 5PT, England
Br J Radiol; 54(640):371 1981

Total body irradiation (TBI) has been shown in a randomized trial to give similar response and survival rates to combination chemotherapy in the treatment of lymphomas. Between 1973 and 1977, 37 patients with Stage III and IV non-Hodgkin's lymphomas were treated at the Royal Marsden Hospital. Twenty-four patients had received no previous therapy. Patients with nodular lymphoma were treated on evidence of progressive disease. TBI of 1.5 Gray (Gy) (150 rad) max permissible dose (MPD) and 12 days or ten fractions treating twice weekly. Eleven patients received hemibody irradiation of 3 Gy (300 rad) MPD in ten fractions and 12 days. The complete response rate in 22 patients with nodular lymphoma was 64% compared to 40% in the 15 patients with diffuse disease. The overall response rate was 73% for the nodular and 80% for the diffuse lymphomas. The medium duration of response was 12 mo. Bone marrow toxicity was the major complication but there was no incidence of serious hemorrhage. Fourteen out of 37 (38%) of patients had platelet counts less than 50000/mm3 and in six of these no further chemotherapy was possible. All six had involvement of the bone marrow and five of them had received hemibody irradiation. The overall response rate of 76% is similar to that achieved with chemotherapy and is without serious toxicity. Subsequent chemotherapy was given successfully except in those patients with prolonged thrombocytopenia which appeared to be related to an involved bone marrow. (no Refs)

40. RADIOTHERAPY IN THE TREATMENT OF LOCALISED NON-HODGKIN'S LYMPHOMA (REPORT NO 16).

Phillips DL
(c/o G. Hudson) Dept. Oncology, Middlesex Hosp., London W1, England
Clin Radiol; 32(5):543-546 1981

This report describes the experience of the BNLI in the treatment of localized (Stages I, II) non-Hodgkin's lymphoma (NHL). About a third of all patients with NHL presenting to collaborators in the BNLI were considered after investigation to have localized disease. This relatively large number suggests that some cases may have been understaged. Patients with Grade I disease were treated with either local irradiation or with local irradiation followed by chlorambucil. Survival rates in the two group s were essentially similar and it appeared that radiotherapy alone provided equally effective treatment. Patients with Grade 2 lymphomas were treated either with local irradiation or with local irradiation followed by COP. Primary nodal disease was not obviously affected by the addition of chemotherapy. Extranodal disease arising in the gut below the diaphragm appeared to be adversely affected by the irradiation which was of necessity spread over several wk, delaying the use of chemotherapy. Extranodal disease arising in the head and neck region is controlled in about 80% of patiens and the routine use of prophylactic combination chemotherapy confers no benefit to the patient. (Author abstract) (5 Refs)

41. NON-HODGKIN'S LYMPHOMA OF WALDEYER'S RING (MEETING ABSTRACT).

Masaki N, Ikeda H, Shigematsu Y, Aosasa K
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Program and Preprints of the 5th Annual Congress of Japan Society of Head and Neck Tumor held in Osaka, Japan, 29-30 May, 1981. Japan Society of Head and Neck Tumor, Chiba 280, Japan, 109 pp., 1981.

Of 331 patients who had Stage I or Stage II non-Hodgkin's lymphoma and had radiotherapy between 1961 and 1979, 202 had tumors in Waldeyer's ring (44 Stage I, 158 Stage II). The 5-yr survival rate for the patients with Stage I and Stage II non-Hodgkin's lymphoma of Waldeyer's ring was 74.4% and 40.6%, respectively. The results of therapy in the patients seen since 1971 was about 20% better than those in the patients seen before then; the 5-yr survival rate for the patients with Stage I and Stage II cancer seen since 1971 was 86.4% and 54.7%, respectively. For the patients with stage II cancer who had been seen since 1971 and given chemotherapy to introduce remission, the 5-yr survival rate was 76%, while for the patients given only radiotherapy it was 49%. Relapse was seen in 30% and 60% of the patients with Stage I and Stage II cancer, respectively. Relapse occurred within 1 yr after radiation therapy in about 80%, and within 2 yr in 90% of the patients. However, relapse occurred after 3 yr in six patients, one patient having a relapse after 7 yr and 11 mo. The distant lymph nodes were the most frequent site of relapse, followed by the stomach and upper abdominal lymph nodes. (no Refs) (In JPN)

42. TREATMENT OF MALIGNANT LYMPHOMAS OF THE OROPHARYNX.

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HNO; 29(9):302-307 1981

The natural history of malignant lymphomas of the oropharynx and their response to treatment are described by evaluating the courses of 41 patients, who after histological verification underwent radiotherapy in the Radiological Clinic of Kiel University between 1965 and 1979. The analysis of the malignant non-Hodgkin lymphomas according to the 'Kiel classification' reveals a clear predominance of the germinal center tumors and the high grade malignancies. The long-term results of treatment show a good prognosis for clinical stages I-III (2 adjacent lymph node or extranodal regions involved above the diaphragm, 'Ann Arbor'-classification modified by Musshoff) with a 85% probability of both survival and freedom of disease. For clinical stages II2-IV long-term actuarial survival and disease free survival were lowered to 51% and 23%. Whereas in 93% a complete tumor regression could be achieved by the primary treatment, one third of these patients developed a recurrence of the disease, mainly caused by incomplete therapy, such as missing the 'extended field' radiotherapy or a necessary chemotherapy because of old age, myelodepression or simply refusal of further treatment. According to the results of this study chemotherapy seems to be necessary from clinical stage II2 on (2 distant lymph node or extranodal regions or three or more regions located anywhere involved above the diaphragm). Finally a refined locoregional irradiation technique for malignant lymphomas of the oropharynx is described: fast electrons and cobalt rays in daily alteration for the posterior cervical lymph nodes. Last but not least, we present the unusual treatment schemes of the 'Kiel Lymphoma Study Group' for malignant non-Hodgkin-Lymphomas of different histologies and stages. (Author abstract) (9 Refs) (In GER)

43. HYPERFRACTIONATED TOTAL BODY IRRADIATION OR BONE MARROW TRANSPLANTATION: I. EARLY RESULTS IN LEUKEMIA PATIENTS.

Shank B, Hopfan S, Kim JH, Chu FC, Grossbard E, Kapoor L, Reid A, Chui C, Mohan R, Finegan D, O'Reilly RJ
Radiation Therapy Dept., Memorial Sloan-Kettering Cancer Cener, New York, NY, 10021

Int J Radiat Oncol Biol Phys; 7(8):1109-1115 1981

A hyperfractionated total body irradiation (TBI) regimen, with partial lung blocking, was developed to reduce the incidence of radiation interstitial pneumonitis (IP) in leukemia patients undergoing bone marrow transplantation. Hyperfractionated TBI (120 rads x 11; 3 x/day) decreased both IP incidence and deaths attributable to IP in 48 patients (mean age, 18 yr; range, 1.5-42 yr) with acute nonlymphocytic leukemia (ANLL), acute lymphocytic leukemia (ALL), and chronic myelocytic leukemia Sixteen patients (33%) developed IP, compared with 14/20 (70%) patients treated earlier with single dose irradiation (1,000 rads). The percentage of deaths related to IP decreased from 50% (10/20) in the earlier series to to 23% (11/48) with fractionated TBI. The 1-yr actuarial survival was 65% for ALL (16 patients) and 72% for ANLL (29 patients). Patients who died and patients who developed IP had a mean age of 25 yr. (11 Refs)

44. COMBINATION OF CHEMOTHERAPY, RADIOTHERAPY AND IMMUNOTHERAPY FOR ACUTE LYMPHOBLAS TIC LEUKEMIA IN CHILDREN.

Suvatte V, Mahasandana C, Tanphaichitr VS, Tuchinda S, Vootiprux V
Dept. Pediatrics, Siriraj Hosp., Mahidol Univ., Bangkok 7, Thailand

J Med Assoc Thai; 64(4):180-191 1981

From 1967 to 1979, 51 children (4 mo to 12 yr old; 30 boys, 21 girls) with acute lymphoblastic leukemia (ALL) were treated with a combination of chemotherapy, radiotherapy and immunotherapy. The plan of treatment depended on the economic status of the family. Two different protocols were used, differing in their use of vincristine and L-asparaginase (used in Protocol I and not in Protocol II) because of their expense. Twenty-six patients received Protocol I and 25, Protocol II. Fifteen patients (57.7%) in Protocol I and 13 (53%) in Protocol II were in continuous hematological remission from 22 mo to 13 yr. Eleven patients in each protocol died. Treatment was discontinued at 5 yr in 10 patients, nine of whom were still in complete remission and in good health from 5.5-13 yr after diagnosis. Since complications and toxicity in patients treated with Protocol I were similar to those seen in Protocol II and the results of treatment in both protocols were similar, the use of combined simple, non-expensive drugs was shown to be as effective as the use of expensive drugs. (44 Refs)

MUSCULOSKELETAL NEOPLASMS

45. THE ROLE OF RADIATION THERAPY IN COMBINATION TREATMENT OF SOFT TISSUE LIPOSARCOMA.

Tishkin VA, Stoliarov VI, Kanaev SV, Frolova ZV
N. N. Petrov Res. Inst. Oncology, USSR Ministry Health, Leningrad, USSR
Vopr Onkol; 27(8):22-25 1981

The end results of surgical and combination (radiation + surgery) treatment of 85 patients with liposarcoma are compared. The 5-yr survival rate following combination therapy proved to be much higher than after surgery (84 and 53.4%, respectively). Application of radiation improves the results of treatment of all histological types of tumor, polymorphocellular liposarcoma included. Indications of standard and concentrated dose-fractionated radiation should be determined by the size of tumor. (Author abstract) (12 Refs) (In RUS)

46. FAST NEUTRON THERAPY FOR LOCALLY ADVANCED SARCOMAS.

Battermann JJ, Breur K
Radiotherapy Dept., Antoni van Leeuwenhoek Hosp., Netherlands Cancer Inst., Plesmanlaan 121, 1066 CX Amsterdam, The Netherlands
Int J Radiat Oncol Biol Phys; 7(8):1051-1053 1981

Preliminary results of a pilot study for the use of fast neutron beam therapy for locally advanced sarcomas are described. In general doses of 19 cGray (cGy) and higher were applied in 4 wk via two opposed ports. Of 22 patients treated, 8 achieved local control after fast neutron irradiation. Four patients were still alive at the time of analysis. None of six patients with chondrosarcoma achieved complete tumor regression, However, in three patients treated for locally advanced low grade malignant chondrosarcoma, a calcified mass was found during follow-up examinations. Results seemed to be better in soft tissue sarcomas than in osteogenic sarcomas. No significant difference was found in tumor site. Some relationship existed between tumor size and local control and between total dose and local control. Six patients developed major complications, including four with skin necrosis. The calculated max doses for skin were 2,130, 2,450, 2,800, and 2,930 cGy, respectively. Three patients died of intestinal damage after irradiation of osteogenic tumors in the pelvis. The results showed that despite a high dose, leading to a high complication rate (6/22 patients), local tumor control was only achieved in 8/22 patients. (9 Refs)

47. THE VALUE OF XERORADIOGRAPHY FOR THE FOLLOW-UP OF BONE AND SOFT TUMORS SUBMITTED TO RADIOTHERAPY.

Nessi R, Lombardi F, Lattuada A, Coopmans de Yoldi G
Istituto di Scienze Radiologiche, Universita di Milano, Via G. Venezian, 1, 20133 Milano, Italy
Radiol Med (Torino); 67(9):623-632 1981

In 38 patients with bone and soft tissue cancers receiving radiotherapy, xeroradiography (X) was performed before, during, immediately after therapy, and later check-ups. Irradiation was applied in seven patients after surgery. The majority (27) had bone tumors of which 22 were Ewing sarcomas. X of malignant bone tumors, especially if widespread, was useful, because it indicated areas affected. When metastases disappear and bone tumor is in involution, X is not necessary, controls can be performed by radiography associated with thermography or scintigraphy. X is of prime importance in evaluation of soft tissue malignant tumors, regardless if they are surgically removed or not. It can be used alone or together with thermography to reveal relapse or late effects of irradiation on superficial soft tissue (edema, fibrosis, necrosis). (17 Refs) (In ITA)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

48. THREE-DIMENSIONAL RECONSTRUCTION OF CT IMAGES FOR TREATMENT PLANNING IN CA OF THE LUNG (MEETING ABSTRACT).

Reinstein LE, McShan D, Land RE, Glicksman AS
Rhode Island Hospital, Providence, RI
The Symposium on Computed Tomography in Radiotherapy, September 18-19, 1981, Arlington, Virginia American Association of Physicists in Medicine; :C4 1981

Radiotherapy planning is usually based upon a two-dimensional, transverse representation of the patient's internal anatomy. This method is inadequate, however, where anatomical structures vary rapidly throughout the treatment vol. For example, in treating a large, medially-placed lesion of the lung with high dose irradiation it is essential to consider the three-dimensional extent of the tumor and its spatial interrelationship with nearby critical organs such as the spinal cord, the heart , and the uninvolved lung. This had been facilitated through the use of a three-dimensional treatment planning system which uses a PDP 11/45 minicomputer to process cross-sectional patient data supplied by computed tomographic images. With this system, the treatment planner can display anatomical surfaces in three-dimensional perspective, create (and simulate) alternative treatment plans, and design individualized field shaping blocks. (no Refs)

49. PROPHYLACTIC CEREBRAL RADIOTHERAPY IN UNDIFFERENTIATED SMALL CELL LUNG CANCER. SHOULD IT BE USED ROUTINELY?.

Jimenez B
Servicio Oncologia Medica, INO de Madrid, Madrid, Spain
Oncologia; 6(4):57-58 1981

Approx 10% of patients with undifferentiated small cell lung cancer have cerebral metastases (CM) at the time of diagnosis. The rate will increase to 80% if patients survive greater than 2 yr. CM are the most frequent cause of death in such patients. Once CM are diagnosed, survival time is 4-10 wk. A study combining different published results found that of 283 patients receiving prophylactic cerebral radiotherapy (PCR), only 7 had initial CM. Of 350 patients not receiving PCR, 22% developed initial CM. Unfortunately survival was not improved and the procedure is not used routinely. However, PCR of 3,000 rad administered in 10 sessions between wk 5 and wk 7 of systemic treatment is recommended; the treatment does not have significant side effects and improves patients' quality of life. (6 Refs) (In SPA)

INSTRUMENTATION AND TECHNOLOGY

50. LINEAR AND NON-LINEAR OPTIMIZATION OF DOSES IN EXTERNAL RADIOTHERAPY.

Legras J, Potdevin M, Legras B
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J Biophys Med Nucl; 5(3):169-172 1981

A method of non-linear optimization of external radiotherapy doses is described that allows results better than those obtained with linear programming. This non-linear method allows the modification of beam geometry by successive trials and thus improves the homogeneity of of doses in the target-vol within the restraints of threshold. (19 Refs) (In FRE)

51. DISTRIBUTION OF DOSE IN WHOLE-BODY IRRADIATION (MEETING ABSTRACT).

Lawrence GP
Physics Department, Royal Marsden Hospital, Sutton, Surrey, England
Br J Radiol; 54(640):370 1981

In most centers where whole-body irradiation is undertaken, therapy units of conventional design are used. The limited facilities available have therefore dictated the techniques developed. The technique described here evolved over a number of yr at the Royal Marsden Hospital. A cobalt-60 unit is used, with the beam pointing horizontally to obtain a large enough radiation field. The patient is treated in a Perspex cot and lies in three positions: on the right and left sides and supine. In each positio n the patient is irradiated with equally weighted opposing fields. A calibration irradiation is done about one wk before the treatment, when the sum of the entrance and exit doses on the skin is determined at different levels of the patient in each of the three positions. From the doses measured the treatment is prescribed in terms of the time spent in each position. A variation in dose is observed not only along the length of the patient but also in transverse planes. With a field size larger than the patient, the source-skin distance and the size of the patient determine the depth dose. As both factors increase so the dose at a given depth increases. The patient's shape at each level results in considerable variation of dose in each plane, but this effect is reduced by treating the patient in a number of positions. (no Refs)

52. MEMORIAL HOSPITAL METHODS OF DOSE CALCULATION FOR 192IR.

Anderson LL, Wagner LK, Schauer TH
Dept. Medical Physics, Memorial Sloan-Kettering Cancer Center, New York, NY
Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

A computerized planar implant guide is presented which supplements the classical dosage tables used as preimplantation guidelines for removable interstitial implants of 192Ir seeds in ribbons. The guide specifies number of ribbons required to produce a desired dose rate at a selected reference point, for given implant dimensions and seed strength. For 10 Gray/day (42 rad/hr) at a particular reference point, seed strength of 0.5 mg Ra equivalent requires approx 1 cm spacing for a wide range of active lengths. A simpler version of the computer algorithm is available on a programmable calculator. (8 Refs)

53. A MONTE CARLO APPROACH TO THE EVALUATION OF DOSE DISTRIBUTION IN HOMOGENEOUS AND INHOMOGENEOUS PHANTOMS IRRADIATED WITH PHOTON AND ELECTRON BEAMS.

Bucciolini M, Pasqui R, Andreucci L
Cattedra di Fisica medica - Istituto di Radiologia, Universita di Firenze, Viale Morgagni - Careggi, 50134 Firenze, Italy
Radiol Med (Torino); 67(9):643-652 1981

This method can be used correctly and directly for calculating the dose distribution in specific radiotherapeutic cases where the geometry and the composition of the structure are well known. Accuracy of dose distribution in non-homogeneous materials cannot be obtained otherwise in radiotherapy today. (15 Refs) (In ITA)

54. USE OF COMPUTERIZED TOMOGRAPHY IN ONCOLOGICAL HYPERTHERMIA.

Bistoli F
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Radiol Med (Torino); 67(10):739-741 1981

Different possibilities for use of computed tomography (CT) in hyperthermia are discussed. Transmission and absorption of energy varies and depends on tissue characteristics. CT can evalua te different pathways, indicate best location, and size of electrodes to be used. With contrast media, CT can show degree of vascularization, type of tumor tissue (humid, dry, or degrees in between). Conductivity: electric, dielectric, or thermic varies accordingly. Tissues surrounding and in contact with the tumor, especially in case of major blood vessels, are important. Researchers are invited to develop these ideas at the level of theoretic physics and applied technology, and the results to be used in clinical practice. (4 Refs) (In ITA)

PRE-CLINICAL STUDIES

55. BRAIN TUMOR THERAPY: PROSPECTS FOR COMBINING BCNU WITH CONVENTIONAL RADIOTHERAPY SCHEDULES.

Wheeler KT, Kaufman K
Cancer Center, Univ. Rochester, Box 704, 601 Elmwood Ave., Rochester, NY, 14642
Int J Radiat Oncol Biol Phys; 7(8):1065-1068 1981

The effectiveness of 1,3-bis(2-chloroethyl)-1 nitrosourea (BCNU) given 2x (3.0 mg/kg) or 3x (2.5 mg/kg) per wk during a conventional daily fractionated radiotherapy schedule (260 rad fractions/wk) were compared with the best daily combination schedule of BCNU (2.0 mg/kg) and radiation for the treatment of male Fischer 344 rats bearing intracerebral 9L/Rn tumors. The median day of death of untreated tumor-bearing rats was 16. Neither x-rays alone nor any of the BCNU alone schedules significantly increased the life span of tumor-bearing rats over that of untreated controls. All three combination schedules significantly increased the lifespan of tumor bearing rats over that observed for untreated tumor-bearing rats and those treated with any schedule of the single agents. Although the combination schedules in which BCNU was administered either 2-3x per wk during daily unfractionated radiotherapy were equally effective (p less than 0.05) in increasing the lifespan of tumor-bearing rats, neither was as effective (p less than 0.04) as the combination schedule in which daily

fractions of BCNU were administered during radiotherapy. (16 Refs)

56. DIFFERENTIAL RBE VALUES OBTAINED FOR MAMMARY ADENOCARCINOMA TUMOR CELL SUBPOPULATIONS AFTER 14.8-MEV NEUTRON IRRADIATION.

DeWyngaert JK, Leith JT, Peck RA, Bliven SF, Zeman EM, Marino SA, Glicksman AS

Section Radiation Medicine, Radiation Biology Lab., Brown Univ., Providence, RI, 02912

Radiat Res; 88(1):118-131 1981

Four closely related tumor sublines isolated from a single mouse mammary adenocarcinoma were examined for their responses to low- and high-linear-energy transfer (LET) radiations (250 kiloVolt x-rays and 14.8 megaelectron Volt neutrons). The sublines, designated 66, 67, 68H, and 4.10, exhibited markedly differing characteristics such as chromosome number and antigen expression and substantial variations in sensitivity to x-rays and selected chemotherapeutic drugs. Real differences were observed in th e relative effects of the two radiations on the different sublines. For example, at the 50% survival level, the relative biological effectiveness (RBE) values were 4.0, 3.6, 3.9, and 2.7 for lines 66, 67, 4.10, and 68H, respectively. At the 10% levels of survival, these values were 2.4, 2.4, 2.2, and 2.0. Most of the variation in the RBE was attributable to differences in the responses of the tumor sublines to the low-LET x-irradiation. At the clinically relevant dose of 2 grays, subline 66 was 50% more resistant to x-rays than subline 68H. In contrast, the response to fast neutrons was not so varied, with little difference among the individual neutron survival curves. The high-LET radiation was capable of essentially eliminating the identities of the different sublines, and as a consequence the complexities imposed by intrinsic heterogeneity were substantially reduced. The results illustrate the need to consider biological information as well as microdosimetric considerations in attempts to relate cellular inactivation responses to radiation quality. (26 Refs)

57. CORONARY ARTERIOSCLEROSS AND ATHEROSCLEROSIS IN FAST NEUTRON OR PHOTON IRRADIATED DOGS.

Bradley EW, Zook BC, Casarett GW, Rogers CC

708 Ross Hall, 2300 Eye St., N.W., Washington, DC, 20037

Int J Radiat Oncol Biol Phys; 7(8):1103-1108 1981

Radiation-induced vascular disease was studied in 39 adult male beagles that received fractionated fast neutron irradiation (total doses of 1,000, 1,500, 2,250, or 3,375 rads) or fractionated photon irradiation (total doses of 3,000, 4,500, or 6,750 rads) to the right lung. The radiation was delivered in four fractions/wk for 6 wk, and the right atrium and coronary groove of the heart were included in the irradiated field. All dogs that survived 75 days postirradiation developed arterial changes such as intimal thickening and adventitial fibrosis. The changes were more severe in neutron-irradiated dogs. Two dogs exposed to neutrons (1,500 and 2,250 rads) also showed severe atherosclerotic plaque formation. Both dogs had elevated serum cholesterol levels, as did neutron-irradiated dogs with hepatic injury. The remaining neutron dogs and all photon-irradiated dogs had normal cholesterol values. Results indicated that clinically accepted fast neutron doses can induce coronary atherosclerosis in a relative short time period. (28 Refs)

58. PILOT STUDY ON NEUTRON THERAPY. PART 3: EXPERIMENTAL RADIOBIOLOGICAL INVESTIGATIONS.

Magdon E

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Radiobiol Radiother (Berl); 22(3):295-298 1981

The relative biological effect (RBE) of neutron radiation was studied in vitro in primary human short-term and permanent cell cultures, Chinese hamster V-79 cells, and mouse L5178Y lymphoma cells, and in vivo in partial and whole-body irradiations of mice and pigs. As determined by loss of cloning ability in cell cultures, survival rates for hemopoietic stem cells and epithelium of small intestine, survival rates after whole-body and thorax irradiation, inhibition of cell proliferation, induction of dominant lethal factors, and fibrosis, RBE was shown to be dependent on dose amount. Values ranged from 1.5-5.0, and decreased with increasing dose in all biological systems tested. Comparison of cells cultured from various tumors with cells cultured from embryonic tissue showed that the higher RBE of neutron radiation on tumor cells compared with normal tissue did not produce a gain in addition to the anoxic gain. RBEs ranged from 2.6-2.8. RBEs for various types of tissue varied considerably, ranging from 1.9-3.8. The highest RBE was found in esophageal tissue. The lowest was found in the hemopoietic system. Fractionation of the dosage raised the RBE for skin from 2.3 to 3.4 for acute reactions and from 2.5 to 3.6 for delayed reactions. RBEs for somatic and genetic damage corresponded. (no Refs)

59. POTENTIATION OF RADIATION EFFECT BY THE PLATINUM DRUG CHIP (MEETING ABSTRACT).

Laverick M, Nias AH

Richard Dimbleby Department of Cancer Research, St. Thomas's Hospital Medical School, London SE1, England

Br J Radiol; 54(640):367 1981

This investigation involves the use of a potential chemotherapeutic agent as a sensitizer of hypoxic cells to X-irradiation. We report the effect of the platinum complex cis-dichloro-bis (isopropylamine) trans-dihydroxy-platinum-IV (CHIP) given as a pretreatment to in vitro cultures of Chinese hamster ovary (CHO) cells and C3H mouse mammary tumor cells. CHIP was given as a one hr pretreatment at 37 C with varying time intervals before X-irradiations under aerated and hypoxic conditions. Time intervals of one, three, five, and 24 hr between drug and radiation in hypoxic CHO cells gave dose modifying factors (DMF) of 1.7, 1.9, 1.36 and 1.0 respectively. The extrapolation numbers N remained unaltered. A one hr delay in drug and radiation treatment of aerated CHO cells gave a much lower DMF of 1.1 but the extrapolation number was reduced. C3H mouse mammary tumor cells showed no potentiation of aerated cells by CHIP to damage by x-rays. Potentiation was only observed under hypoxia. A max DMF of 1.7 was obtained after a one to three hr delay between drug and radiation treatment. By five hr the DMF was reduced to 1.14 and at eight hr no enhancement of cell killing was observed. Under optimal conditions of drug and X-irradiation the effect of pretreatment by CHIP on hypoxic cells is manifested not only as a decrease in D0 which is measured by DMF, but also as a reduction in the 'shoulder region' to a point where survival is identical to tha t observed in aerated X-irradiated tumor cells. (no Refs)

60. THE MODIFICATION OF TOXIC AND RADIOPROTECTIVE EFFECTS OF CYSTAMINE BY CALCIUM IONS IN RATS.

Kuna P
Purkyne Medical Res. Inst., CS-50260 Hradec Kralove, Czechoslovakia
Radiobiol Radiother (Berl); 22(3):318-323 1981

The effect of calcium ions on the toxic and radioprotective effects of cystamine were tested in male and female Wistar rats. Varying doses of cystamine were injected ip with 275 mg Sandosten calcium salt soln/kg body wt. Controls received cystamine in 0.9% saline soln. Administration of calcium salt with cystamine reduced the acute toxicity produced by cystamine alone by an insignificant amount in unirradiated rats. The significant radioprotective effect of 50 or 60 mg cystamine/kg body wt prior to irradiation was reduced by an insignificant amount by simultaneous administration of 200 mg calcium gluconate/kg body wt. Calcium gluconate alone had no radioprotective effect. Female rats anesthetized with sodium pentobarbital (40 mg/kg body wt ip) showed cystamine-induced arterial hypotension, reduced cardiac output, and decreased blood flow to bone marrow, spleen, small intestine, salivary glands, and skin. Administration of 200 mg calcium gluconate/kg body wt with cystamine reduced these effects. (9 Refs)

61. PROTECTION OF HEMOPOIETIC TISSUE IN WHOLE BODY GAMMA IRRADIATED MICE BY CYSTAMINE GIVEN INTRAMUSCULARLY.

Kuna P
Purkyne Med. Res. Inst., CS-50260 Hradec Kralove, Czechoslovakia
Radiobiol Radiother (Berl); 22(3):315-317 1981

Protection of hemopoietic cells by cystamine was tested in male white SPF mice aged 10-12 wk. Cystamine (150 mg/kg body wt) was injected ip or im. Controls received ip or im injections of distilled water in the same vol as the cystamine injections. Ten min after injection the mice were exposed to 0.462 Gray/min gamma radiation from a 60Co source for a total dose of 8 Gray. Endogenous spleen colonies and the incorporation of radioiron were evaluated. DNA synthesis in the spleen was measured by the incorporation of 15I-labeled iodouridine. Both ip and im injections of cystamine protected hemopoietic stem cells in a similar manner. Protected animals showed in increase in 59Fe and 125I uptake, but the difference ip-injected mice and controls was not significant. Im injection was more effective than ip injection. Uptake of 59Fe and 125I was significantly higher in im-injected animals than in controls. The higher effect of im over ip injection was confirmed. (7 Refs)

62. HYPOXIC FRACTION AND REPAIR OF POTENTIALLY LETHAL RADIATION DAMAGE IN TWO HUMAN MELANOMAS TRANSPLANTED INTO NUDE MICE.

Chavaudra N, Guichard M, Malaise EP
Laboratoire de Radiobiologie Cellulaire, Institut de Radiobiologie Clinique, Institut Gustave-Roussay, 16 bis, avenue Paul-Vaillant-Couturier, 94800 Villejuif, France
Radiat Res; 88(1):56-68 1981

Radiosensitivity of Ma 11 and Be 11 cell lines, established in culture from lymph node metastases of two different human melanomas, was investigated. Athymic female nude mice, arising from a cross of heterozygous nu/+ females and homozygous nu/nu males, were given whole-body irradiation with 5 Grays (Gys) of 137Cs gamma-rays, and after 48-72 hr, 2-3 x 10(6) tumor cells from monolayer cultures were injected in both flanks of the mice. Tumors were irradiated in situ with 137Cs gamma-rays and removed from the mice 5-10 min, or variable times, after irradiation and tumor cell suspensions were prepared. Cell yields were not different between control and irradiated mice. Plating efficiency was on the av higher for the Ma 11 tumors than for the Be 11 tumors. In vivo survival curves were obtained for each strain of tumor, and the dose of gamma-irradiation at which no cells would survive (D0) was extrapolated; the D0 was 4.22 Gys for the Ma 11 and 5.85 Gys for the Be 11. The D0 for the Be 11 tumor cells was significantly higher. The level of hypoxic cells in the Be 11 tumor (40%) was significantly lower than that in the Ma 11 tumor (62%). Survival rates of the irradiated tumor cells that were put in suspension were significantly higher when suspension and plating were performed after a 6-24 hr postirradiation delay. An elevated level of hypoxic cells and a repair of potential lethal damage were observed in the Ma 11 and Be 11 tumors growing in nude mice; these two factors were thought to partially explain possible reasons for the radioresistance of human melanomas. (40 Refs)

63. EXTRACORPOREAL IRRADIATION OF THE BLOOD IN A RAT MODEL FOR HUMAN ACUTE MYELOCYTIC LEUKEMIA. INCREASED EFFICACY AFTER COMBINATION WITH CELL MOBILIZATION BY LOW-MOLECULAR-WEIGHT DEXTRAN SULFATE.

Hagenbeek A, Martens AC
Radiobiological Inst. TNO, 151 Lange Kleiweg, 2280 HV Rysw3k, The Netherlands
Radiat Res; 88(1):144-154 1981

The effects of extracorporeal irradiation of the blood (EICB) in combination with mobilization of leukemic cells was investigated in a rat model for human acute myelocytic leukemia (AML). Repeated injections of dextran sulfate (DS) on 4 subsequent days (days 18, 19, 20, and 21 after innoculation with BN AML cells) induced a significant increace in the number of peripheral leukemic cells. The increase factor measured 6 hr after the first injection was 1.8 at day 18, 3.4 at day 19, 4.5 at day 20, and 3.2 at day 21. When rats were treated with a combination of cell mobilization and EICB the blood compartments and the rapidly exchangable tissue pools were depleted to 10-25% of their original sizes. These reductions were about 2x as great as those observed when rats were treated with EICB alone. The slowly exchangable tissue pools were also significantly depleted when DS was combined with EICB. The results showed that E ICB in combination with cell mobilization significantly reduces the total tumor burden with a max reduction of approx 50%. (29 Refs)

64. THE EFFECT OF FRACTIONATED VERSUS UNFRACTIONATED TOTAL BODY IRRADIATION ON THE GROWTH OF THE BN ACUTE MYELOCYTIC LEUKEMIA.

Hagenbeek A, Martens AC
Bone Marrow Transplant Unit., U.C.L.A. Sch. Medicine, Center for the Health Sciences, Los Angeles, CA, 90024
Int J Radiat Oncol Biol Phys; 7(8):1075-1079 1981

The quantitative and qualitative effects of various total body irradiation (TBI) regimens in a rat acute myelocytic leukemia model (BNML) which shares many characteristics with human acute myelocyitc leukemia, with emphasis on tumor load reduction are described. The results of high dose rate (HDR) acute, and HDR fractionated TBI, and the efficacy of low

dose rate (LDR) continuous TBI are also reported. The most important determinants of HDR TBI efficacy were the total radiation dose and the dose delivered per fraction, and the time interval between the fractions. In the LDR TBI group, more leukemic cells were killed at higher radiation doses. However, at the time termination of treatment with 2,000 cGray, 50% of the rats had died. The remaining rats in this group as well as those treated with lower radiation doses all died from leukemia. Unfractionated TBI (900 cGray HDR) appeared to be one of the most effective regimens in terms of reducing the tumor load. However, approx half of the rats were killed by radiation-induced toxicity. The calculation of the log cell kill from the prolongation of median life span was found to be a valid method for determining the efficacy of TBI. (12 Refs)

65. INCREASED SKELETAL METASTASES OF SPONTANEOUS CANINE OSTEOSARCOMA AFTER FRACTIONATED SYSTEMIC HYPERTHERMIA AND LOCAL X-IRRADIATION.

Lord PF, Kapp DS, Morrow D
Dept. Diagnostic and Therapeutic Radiology, Section Comparative Medicine, Yale Univ. Sch. Medicine, New Haven, CT, 06510
Cancer Res; 41(11,part1):4331-4334 1981

Seven dogs with spontaneously occurring localized osteogenic sarcoma of an extremity were treated with fractionated systemic hyperthermia and high-dose/fraction local irradiation. Systemic hyperthermia was induced by immersion of the animal in a controlled-temperature water bath, and the temperature was adjusted to maintain the animal's rectal temperature at 42.0-42.5 C for 1 hr. This was immediately followed by irradiation of the involved bone at a dose of 600 rads. The treatment was repeated at 5-day intervals for a total of seven fractions. The primary tumor initially regressed in all cases, but recurred locally in six of seven dogs at 65 to 195 days after initiation of therapy. Five dogs developed bone metastases as the first clinical site of metastatic disease at 56 to 310 days. At necropsy, six dogs had widespread metastases to the bones, lung, and other organs. The early development of bone metastases and the widely disseminated nature of the disease at autopsy suggests a therapy-induced alteration in the course of this spontaneously occurring tumor when compared to treated and untreated historical controls. (Author abstract) (31 Refs)

66. MORPHOLOGY OF RAT RHABDOMYOSARCOMA AFTER SEPARATE AND COMBINED EXPOSURE TO IONIZING RADIATION AND HYPERTHERMIA.

Lushnikov EF, Svinogeeva TP, Shtein LV, Konopliannikov AG
Res. Inst. Medical Radiology, Obninsk, USSR
Med Radiol (Mosk); 26(8):53-60 1981

Combined effect of ionizing radiation and hyperthermia was studied in Wistar rats with sc transplanted radioresistant rhabdomyosarcoma R-1. Animals were subjected to a single or repeated irradiation with gamma rays at 2,000 rads and/or to a single or repeated hyperthermia. Animals were sacrificed on days 1, 2, 4, 7, or 30 after treatment, and tumor specimens were subjected to histological examination. Irradiation or hyperthermia alone produced only slight inhibition of tumor growth. Irradiation in combination with hyperthermia resulted in complete tumor regression in 30% of animals. Av duration of survival was 120 days, compared with 90 days in animals subjected to irradiation or hyperthermia alone. Irradiation alone produced gradual changes in tumor histology, compared with rapid onset of tissue necrosis after hyperthermia alone. (14 Refs) (In RUS)

67. EFFECTS OF HYPERTHERMIA AND RADIATION ON MOUSE TESTIS STEM CELLS.

Reid BO, Mason KA, Withers HR, West J
(c/o Mason) Dept. Experimental Radiotherapy, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
Cancer Res; 41(11,part1):4453-4457 1981

The response of mouse testis stem cells to hyperthermia and combined hyperthermia-radiation treatments was assayed by spermatogenic colony regrowth, sperm head counts, testis wt loss and fertility. With the use of spermatogenic colony assay, thermal enhancement ratios at an isosurvival level of 0.1 were 1.27 at 41 degrees, 1.80 at 42 degrees, and 3.97 at 43 degrees for testes exposed to heat for 30 min prior to irradiation. Sperm head counts were reduced by heat alone from a surviving fraction of 0.58 at 41 degrees to 0.003 at 42.5-43.5 degrees. Curves for sperm head survival measured 56 days after the testes had been heated for 30 min prior to irradiation were biphasic and showed a progressive downward displacement to lower survival with increasing temperature. The 41, 42, and 43 degree curves were displaced downward by factors of 2, 58, and 175, respectively. The proportion of animals remaining sterile after 30 min of heat (41-43 degrees) and the median sterility period in days increased with increasing temperature. The minimum sperm count necessary to regain fertility was 13% of the normal mouse level. (Author a bstract) (22 Refs)

REVIEWS

68. MODERN INTERSTITIAL AND INTRACAVITARY RADIATION MANAGEMENT.

George FW
Radiology Dept., Univ. Southern California Sch. Med., Los Angeles, CA
Modern Interstitial and Intracavitary Radiation Management. George FW, ed. New York, Masson Publishing USA, Inc., Cancer Management, Vol. 6, 132 pp., 1981.

Selected presentations given at the First International Endocurietherapy Symposium explore different aspects of radiation brachytherapy procedures. Topics discussed include (1) methods of dose calculation for 192Ir, (2) clinical dosimetry with 125I, (3) biological doses with template distribution patterns, (4) hyperthermia in endoradiotherapy, (5) interstitial curietherapy in the treatment of anorectal cancer, with report on 31 cases, (6) radiobiological basis for low dose rate brachytherapy, (7) pediatric brachytherapy, (8) role of brachytherapy in the treatment of primary carcinoma of the vagina and female urethra, (9) physical properties, photon dosimetry, and effectiveness of 125I, (10) implantation of 125I supplementing external radiation as treatment for carcinoma of the pancreas, with preliminary report on 10 cases, (11) interstitial implantation of lung cancer, (12) endoradiotherapy for cancer of the prostate, and (13) results of treatment of intraoral carcinoma by 192Ir hairpin technique compared with results by Ra needles. (187 Refs)

69. NEW MODALITIES IN CANCER TREATMENT: HEAVY CHARGED PARTICLES.

Hall EJ, Phil D

Radiological Res. Lab., Columbia Univ. Coll. Physicians and Surgeons, New York, NY, 10032

Br J Radiol; 54(645):773-781 1981

Heavy charged particles represent the ultimate that the physicist can contribute to the development of radiation sources for therapy. Of the heavy charged particles, protons are the least expensive to accelerate and can be manipulated to give a sharply defined high-dose vol with a rapid fall-off of dose outside the target area. The biological properties of protons do not differ significantly from x or gamma rays. Negative pi mesons require an elaborate accelerator for their production. Pions offer the possibility of concentrating energy, some of it densely ionizing with a reduced oxygen enhancement ratio and elevated biological effectiveness within the designated tumor vol, while minimizing the dose of sparsely ionizing radiation to the normal tissues traversed. High-energy heavy ions offer the greatest flexibility and allow localized dose distributions and also, with the higher Z particles, a substantial reduction of the oxygen enhancement ratio can be achieved. The ultimate choice of particle depends upon what turns out to be the most important factor in radiotherapy - an improved localization of dose or a reduction in the dependence of cell killing on the presence of molecular oxygen. (Author abstract) (22 Refs)

70. RADIOTHERAPY.

Bloom HJ

Dept. Radiotherapy, Royal Marsden Hosp., Inst. Cancer Res., London SW3, England

Recent Results Cancer Res; 78:132-153 1981

The role of radical radiotherapy in the primary treatment of adenocarcinoma of the prostate is reviewed. The most appropriate treatment should be selected after taking into account tumor stage and grade, the age and general condition of the patient, any previous treatment, the available facilities, and the effective procedure which interferes least with quality of life. Interstitial irradiation has low morbidity and appears effective as curative treatment of early cases; however, many apparently early tumors clinically confined to the prostate are advanced due to regional lymph node spread. External beam therapy should be used for such cases at the outset, or as a supplement to interstitial irradiation. Lymph node involvement and treatment policy are discussed with respect to lymphographic and histological assessment. External beam therapy is discussed with respect to tumor dose, treatment vol, and complications. Factors influencing radiation response and prognosis include histological grade, clinical stage of the primary tumor, obstructive changes in the iv pyelogram, tumor latency and delay in treatment. Other approaches to treatment are reviewed, including improved radiation schedules, combined irradiation and endocrine treatment, postoperative radiotherapy, preoperative radiotherapy, combined interstitial and external beam therapy, reduction of radioresistance of hypoxic tumor cells, and adjuvant chemotherapy. Long term results are necessary before the role of interstitial and/or external beam techniques can be adequately assessed. (63 Refs)

* U.S. GOVERNMENT PRINTING OFFICE 1982—361-847/113

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BREAST NEOPLASMS

1. ADJUVANT RADIOTHERAPY IN OPERABLE BREAST CANCER: CORRELATION BETWEEN DOSE IN INTERNAL MAMMARY NODES AND PROGNOSIS.

Strender LE, Wallgren A, Arndt J, Arner O, Bergstrom J, Blomstedt B, Granberg PO, Nilsson B, Raf L, Silfversward C
Radiumhemmet, Karolinska sjukhuset, S-104 01 Stockholm, Sweden
Int J Radiat Oncol Biol Phys; 7(10):1319-1325 1981

In a controlled clinical trial involving 960 patients with operable breast cancer, preoperative radiotherapy (RT) in 316 was compared to modified radical mastectomy followed either by

HE 20.3173/2:

no fu rther treatment (321) or postoperative RT (323). Of the total patients, 654 were followed for greater than 5 yr. Compared to the surgically only treated patients, mortality in those who received preoperative RT was significantly reduced ($p = 0.05$) while mortality in those treated with postoperative RT was only slightly (non-significantly) reduced. In preoperative RT mortality was similar with either the wide field or limited field techniques, while with postoperative RT, only the wide field technique reduced mortality. Preoperative RT significantly improved survival of patients with tumors in the inner half of the breast and with both techniques. The RT dose in the ipsilateral internal mammary nodes was, on the av, lower with the postoperative, than with the preoperative technique. This difference in dose-distribution in the internal mammary nodes is analyzed. (18 Refs)

2. PRIMARY RADIATION THERAPY FOR EARLY BREAST CANCER: THE EXPERIENCE AT THE JOINT CENTER FOR RADIATION THERAPY.

Harris JR, Botnick L, Bloomer WD, Chaffey JT, Hellman S
Dept. Radiation Therapy, Joint Center Radiation Therapy, Harvard Medical Sch., 50 Binney St., Boston, MA, 02215
Int J Radiat Oncol Biol Phys; 7(11):1549-1552 1981

The results of primary radiation therapy in 176 consecutive patients with clinical Stage I and II carcinoma of the breast were reviewed (184 tumors were involved). Median follow-up was 47 mo. Fifteen of 184 cancers (8%) relapsed in the breast of axilla: 12 in the breast alone, 2 in the axilla alone, and 1 in both breast and axilla. Breast relapse was not related to the size of the primary, but was related to the presence of clinically positive axillary nodes: 7/138 (5%) with clinically negative nodes relapsed in the breast, while 6/46 (13%) with clinically positive axillary nodes relapsed. Patients undergoing interstitial implantation had a lower breast relapse rate than those not undergoing implantation: 1/73 (1%) implanted patients relapsed compared with 12/111 (11%) not implanted. Of those undergoing excisional biopsy, 1/63 (2%) implanted patients relapsed compared with 9/103 (9%) patients not implanted. Patients who received higher radiation doses had fewer relapses than those with lower doses: 8/68 (12%) who received less than 1,600 ret (rad-equivalent therapeutic) relapsed in the primary tumor area, compared to 0/19 who received more than 1,700 ret. These results demonstrate that a high level of local tumor control can be achieved following excisional biopsy by delivering 4,500-5,000 rad to the entire breast combined with supplemental irradiation to the primary tumor area. The use of external beam irradiation as a comedown boost to the primary tumor area is a reasonable alternative to interstitial implantation, which has significant disadvantages. (Author abstract) (17 Refs)

3. TREATMENT OF STAGE I AND II ADENOCARCINOMA OF THE BREAST BY TUMOR EXCISION AND I RRADIATION.

Bedwinek J
Div. Radiation Oncology, Mallinckrodt Inst. Radiology, 4511 Forest Park, St. Louis, MO, 63108
Int J Radiat Oncol Biol Phys; 7(11):1553-1559 1981

In recent yr, the use of irradiation and breast conserving surgery as primary treatment for Stage I and II adenocarcinoma of the breast has been recommended in a number of articles. Radiation oncologists should try to participate in one of the two prospective trials evaluating the alternatives to mastectomy that are currently underway in the United States. One trial is by NCI, the other by the National Surgical Adjuvant Breast Project. If a patient cannot be entered into one of these trials or refuses to participate, her management should be based on considerations of patient selection, types of breast conserving surgical procedures, and the technical details of irradiating the intact brest, each a factor involved in the selection of patients for breast-conserving surgery and irradiation. Patient selection is discussed with respect to tumor size, breast size, multiple breast masses, distant metastases, and patient attitude. Breast conserving surgery may involve wedge resection, segmental mastectomy, or partial mastectomy (all synonymous); or tylectomy, tumorectomy, and lumpectomy (synonymous). Better cosmetic results are obtained with tylectomy. In addition to tumor excision, most patients should have either an axillary node sampling or an axillary node dissection. The question of whether to perform a low axillary node sampling or a full axillary node dissection is unresolved. Crucial technical considerations that apply to all irradiation situations include fields to be irradiated, dose, boost to the site of tumor excision, wedges or compensating filters, bolus, matching the supraclavicular field with the tangential fields, alignment of the tangential beam with the chest wall contour, and matching the tangential field with the internal mammary field. (14 Refs)

4. THE OUTCOME OF TREATMENT BY TUMORECTOMY AND RADIOTHERAPY OF PATIENTS WITH OPERABLE BREAST CANCER.

Vilcoq JR, Calle R, Stacey P, Ghossein NA
(c/o Ghossein) Dept. Radiology, Albert Einstein Coll. Medicine of Yeshiva Univ., 1300 Morris Park Ave., Bronx, NY, 10461
Int J Radiat Oncol Biol Phys; 7(10):1327-1332 1981

Survival, local-regional failure and results of salvage surgery were studied retrospectively in 314 patients in two hospitals treated by tumorectomy followed by radiotherapy (RT) for surgically operable breast cancer. Patients were selected who had cancers that could be locally resected without causing significant deformity of the breast. All patients were followed for at least 3 yr. Tumors in 214 patients were 3 cm or less in size and in 74 they were 6 cm or less. The 3-and 5-yr absolute survivals, with no evidence of disease (NED) was 88% (276/314) and 84% (190/225), respectively. About 95% of those who were alive without disease had preserved breasts. Less than 15% were dead or alive with metastatic disease either alone or associated with local recurrences. After 3 and 5 yr, there were 7% (21/314) and 10% (23/225) local-regional failures, respectively. Salvage surgery in 12/14 patients with proven recurrences was either a modified or simple mastectomy; 8/14 were alive with NED after the minimum follow-up period. Local failure was not related to tumor size and was not necessarily associated with disseminated cancer. Tumorectomy followed by RT is an acceptable alternative to mastectomy, particularly since salvage surgery can usually be successfully performed for recurrences. (33 Refs)

5. RADIOTHERAPY IN METASTATIC MAMMARY CARCINOMA.

Falchi AM, Balli M, De Maria D
Istituto di Radiologia, Universita di Modena, Modena, Italy
Radiol Med (Torino); 67(11):864-865 1981

Treatment of mammary carcinoma metastases by radiotherapy is reviewed. The following aspects are discussed: location, doses, scheduling, association with different therapies, survival time, and quality of life. In one study of 1,075 mammary carcinoma patients treated by surgery followed by radiotherapy, 105 had relapses treated only by near x-ray therapy (500 rad/

day up to 6,000 rad); 11 survived greater than 20 yr. (12 Refs) (In ITA)

6. TECHNICAL PROBLEMS AND RESULTS OF BONE METASTASES RADIOTHERAPY IN MAMMARY CARCINOMA.

Rimondi C, Busutti L, Carpani B
Divisione di Radioterapia, Ospedale Malpighi, Bologna, Italy
Radiol Med (Torino); 67(11):895 1981

Thirty six patients with metastatic carcinoma were given radiotherapy (telecobalt or deep roentgen 2,500-4,000 rad) Twenty seven had palliative and 9 radical therapy. The radiological follow-up indicate good response and partial repair of the lesions in 66.5%, and it remained favorable after 3 mo in 55% of the cases. The subjective response was good in 86%, and after 3 mo it was 64.5% of the cases. (no Refs) (In ITA)

7. METASTATIC BREAST CANCER: OVARIAN ABLATION WITH LOWER HALF-BODY IRRADIATION.

Fitzpatrick PJ, Garrett PG
500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 7(11):1523-1526 1981

Between 1974 and 1979, 34 pre- or perimenopausal (not more than 5 yr of menopause) women (33-56 yr old, median age 46) with metastatic breast cancer to bones in the lower body were treated with lower half-body irradiation (LHBI). Most suffered pain. The radiation fields extended from the umbilicus to the patellae; single, mid-plane tumor doses of 1,000 rad were given to 30 patients and 800 rad to the other 4. An overall subjective direct response to LHBI was seen in 21/26 (81%) assessable patients. The response was complete in 17 (65%) and lasted for a median duration of 17 mo (3-31 mo). Partial responses were seen in four patients (16%) with a median duration of 2 mo. Five women did not benefit from treatment. An indirect response resulting from ovarian ablation was obtained in 9/28 (32%) assessable patients; improvement lasted for a median duration of 17 mo. None of the six perimenopausal women had an indirect response. Benefits to the premenopausal women included regression of tumor in the chest wall and regional nodes (5/9), relief of pain and the healing of obvious metastases (5/11), reduction of pleural effusion (2/6), and improved liver function (1/6). For all patients, median survival was 58 wk. Response to castration in unirradiated metastases could be assessed in 28 patients; 2-yr actuarial survival rate was 86% for those who achieved an indirect response compared to 16% for nonresponders. Toxicity to LHBI was minimal. Further treatment for progressive cancer was required in 26/34 patients: in no case did LHBI treatment compromise subsequent treatment. (8 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

8. PERMANENT AND REMOVABLE IMPLANTS FOR THE BRACHYTHERAPY OF BRAIN TUMORS.

Gutin PH, Phillips TL, Hosobuchi Y, Wara WM, Mackay AR, Weaver KA, Lamb S, Hurst S
(c/o Editorial Office), Dept. Neurological Surgery, 350 Parnassus Ave., Suite 807, San Francisco, CA, 94117
Int J Radiat Oncol Biol Phys; 7(10):1371-1381 1981

Brachytherapy was employed in 37 patients with primary or metastatic brain tumors. Forty implantations with 192Ir, 198Au or 125I by stereotactic neurosurgical techniques were used. Most tumors had recurred after surgery, whole brain irradiation, and chemotherapy. Sixteen implants were permanent while 24 were in plastic catheters inserted through burr holes. One or more sources were positioned in each tumor to deliver 3,500-7,350 rad to the tumor periphery for 198Au, 4,000-12,000 rad for 192Ir, and 3,000-20,000 rad for 125I. In six patients treated with 192Ir, three had objective responses for 2, 4 and 12 mo; two were stabilized for 8 and 11 mo. Among 11 treated with 198Au, three of seven evaluable patients responded for 3, 5 and 37+ mo. A patient who received an interstitial booster dose with 198Au after whole brain irradiation stabilized for 15 mo before development of spinal metastases. Among six who received permanent implants of low activity 125I, three with glioblastomas or anaplastic astrocytomas continued to deteriorate, presumably because dose rate was too low. One patient with a low-grade astrocytoma (optic chiasm) responded dramatically to permanent, low activity 125I; another, with hypothalamic glioma, responded and was stable for 9 mo when external radiation was used. Seventeen removable high activity 125I sources were implanted in 15 patients with recurrent malignant primary or metastatic tumors. Of 12 presently evaluable, eight patients responded for 4-8 mo, three stabilized for 3, 7, and 11 mo, while one patient with a metastatic melanoma failed to improve despite two implants, 8 wk apart. (17 Refs)

9. INTERNAL IRRADIATION FOR CYSTIC CRANIOPHARYNGIOMA.

Kobayashi T, Kageyama N, Ohara K
Dept. Neurosurgery, Nagoya Univ. Sch. Medicine, 65, Tsuruma-cho, Showa-ku, Nagoya, Japan
J Neurosurg; 55(6):896-903 1981

The authors report the results of internal irradiation with labeled chromic phosphate (32P) and gold-198 (198Au) colloid in eight cases of cystic craniopharyngiomas. They used a newly developed dosimetric formula, by which the radiation dose at the cyst wall and at any point far from the radioactive source can be calculated. Ten courses of irradiation in eight patients were carried out by injection of either 32P or 198Au colloid into the cyst through an Ommaya drainage system that had been placed at craniotomy. Follow-up studies ranging from 13 to 156 mo revealed that all cysts were effectively treated, with elimination of fluid or collapse of the cyst. This was confirmed by Conray cystography and/or computerized tomography. Not only the dose delivered to the wall but also the thickness of the cyst wall and the location of the cyst are important factors in planning internal irradiation. A safe and adequate dose to the cyst wall could range between 9,000 to 30,000 rads for craniopharyngioma. This treatment is suitable for large cysts that are thought to be difficult to remove radically, recurrent cysts resistant to previous treatment, or multiple cysts. Internal irradiation may also be applicable in other cystic intracranial tumors if dosimetry is calculated accurately. (Author abstract) (19 Refs)

10. PINEAL TUMORS IN CHILDREN AND ADOLESCENTS. TREATMENT BY CSF SHUNTING AND RADIOTHERAPY.

Abay EO, Laws ER, Grado GL, Bruckman JE, Forbes GS, Gomez MR, Scott M
(c/o Laws) Dept. Neurologic Surgery, Mayo Medical Sch., Mayo Clinic, Rochester, MN, 55905
J Neurosurg; 55(6):889-895 1981

Tumors of the pineal region account for 3% to 8% of pediatric intracranial tumors. The treatment of such tumors has

been in a state of flux between conservative therapy (cerebrospinal fluid shunting and radiotherapy) and direct surgical removal. A brief history and review of the literature with analysis of both approaches is given, and the Mayo Clinic's experience with conservative treatment of tumors in the pineal region in patients 20 yr and younger (27 cases) is studied and analyzed. The series comprises 21 boys and 6 girls, with an age range of 1 to 20 yr (mean 13.7 yr). Follow-up examinations are complete and range from 1 to 24 yr, with a mean follow-up period of 7.8 yr. The median survival time for these patients treated with shunt and radiotherapy is 17.7 yr. There was no mortality from treatment and complications were rare. The details of the clinical presentation, diagnostic findings, pathology, therapy, r ecurrence, and survival are presented. All patients under 6 yr of age (6 cases) had recurrences, 50% in other areas in the brain and 50% in the spinal cord, perhaps pointing to the need for whole-brain and spinal-axis irradiation in patients in this age group. The results of this study of the conservative approach form a standard against which results of any other type of therapy may be compared. (Author abstract) (53 Refs)

DIGESTIVE NEOPLASMS

11. RADIOTHERAPY FOR ESOPHAGEAL CARCINOMA.

Pearson JG
Div. Radiation Oncology, Univ. Alberta, 11560 Univ. Ave., Edmonton, Alberta T6G 2Z2, Canada
World J Surg; 5(4):489-497 1981

Improvements in curative and palliative radiotherapy for esophageal carcinoma during the last 30 yr are reviewed; value of radiotherapy in treatment of the disease is compared with that of surgery. Curative radiotherapy should be attempted in non-debilitated patients with squamous or undifferentiated carcinomas and without distant metastases. Length of the primary tumor and any detectable lymph node metastases should extend less than 9 cm; no invasion of adjacent organs should be apparent. The dose is 4,800-5,300 rads throughout a 15 x 6.5 cm cylindrical vol given in 20 equal fractions. Factors that influence prognosis following curative radiotherapy include tumor extent, sex, age and general condition, tumor site, and histology (best prognosis is for well-differentiated squamous carcinoma). Approx 75% of patients who receive palliative radiotherapy experience relief of dysphagia, and some remain euphagic. Radiotherapy frequently fails due to recurrence at the primary site. However, mortality for moderate-dose radical radiotherapy is less than that following radical surgery. Radiotherapy appears more effective for the treatment of tumors in the upper two-thirds of the esophagus, whereas surgery is more effective for tumors in the lower third. (38 Refs)

12. WHOLE ABDOMINAL RADIATION IN THE MANAGEMENT OF METASTATIC GASTROINTESTINAL CARCINOID TUMOR.

Keane TJ, Rider WD, Harwood AR, Thomas GM, Cummings BJ
Dept. Radiation Oncology, Princess Margaret Hosp., Toronto, Ontario, Canada
Int J Radiat Oncol Biol Phys; 7(11):1519-1521 1981

Treatment of 28 patients (19-69 yr old; mean age 50 yr; 15 males, 13 females) with biopsy proven metastatic carcinoid tumor who had macroscopic residual disease following palliative bowel resection or biopsy is reported. Twenty-one of the patients had carcinoid syndrome: all but one had liver metastases, two had liver disease as their only site of macroscopic disease within the abdomen. Primary sites included ileum in 17, cecum in 3, and undetermined in 2. Four of the seven non-syndrome patients had liver metastases and macroscopic abdominal disease and three had macroscopic residual abdominal disease alone. None of the patients had prior chemotherapy. Twenty-four patients received whole abdominal radiation (WAR) therapy within 6 mo of diagnosis. The planned midline tumor dose was 2,000-2,500 rad in 20-25 fraction in 4-5 wk; three patients did not complete the planned course of therapy. At 5 yr, none of the syndrome patients were alive their median survival from the date of radiation therapy was 20 mo. At 5 yr, 6/7 non-syndrome patients were alive. Urinary 5-hydroxy indole acetic acid (5HIAA) levels generally remained stable for many mo or marginally increased in the post treatment period. Survival of syndrome patients was not influenced by pretreatment levels of 5HIAA. In five of the syndrome patients, sequential liver scans showed light diminution of metastases. Of the nonsyndrome patients with measurable disease, two had complete response and one had a partial response. Of the three patients who did not complete WAR, one sustained a nonfatal pulmonary embolus at 1800 rad, and two developed intractable diarrhea and small bowel ileus contributing to their deaths. Relief of abdominal pain was documented in approx half to the syndrome patients. (2 Refs)

13. ADAPTABILITY OF RADIOTHERAPY FOR COLON CANCER.

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Nippon Rinsho; 39(5):199-203 1981

Use of radiotherapy alone or as a adjunct to surgical treatment of colon cancer is discussed. As organs in the pelvic cavity are relatively tolerant of irradiation, the most appropriate use of radiotherapy is for cancer of the colon in this area (rectum and Sigmoid flexure). Radiotherapy has several uses preoperatively (eg reducing vascularity, reducing the tumor mass, reducing infiltration of the surrounding tissue), while its hazards include potential for patients to receive unnecessary radiation, possibility of patients with Dukes A type of cancer receiving irradiation when they do not need it, and receiving radiation outside the radiation field. Postoperative irradiation allows the possibility of determining the treatment plan after examining the tumor site. Curative radiotherapy employed alone can be helpful for patients with highly differentiated eruptive-type cancers and for elderly and weakened patients who are not candidates for surgery. Palliative radiotherapy is appropriate for patients who are not expected to have cures but who have symptoms such as pain, hemorrhage, tenesmus, ulcers, and metastasis. Palliative radiotherapy performed in 18 patients with inoperable colon cancer and in 11 with recurrent colon cancer resulted in av postirradiation survivals of 16.6 mo for the inoperable and 11.8 mo for the recurrent cases. Symptoms of diarrhea were also controlled with the 5,000-6,000 rads of radiation administered to these patients. (16 Refs) (In JPN)

14. EFFICACY OF VARIOUS IRRADIATION DOSES IN PANCREATIC CARCINOMA.

Barkanov AI, Ankudinov VA
All-Union Cancer Res. Center, Moscow, USSR
Med Radiol (Mosk); 26(9):20-24 1981

Efficacy of radiotherapy was studied in 125 patients (75 men, 50 women; 84.8% were 41-70 yr old) with cancer of the pancreas. Among these patients, 83 had lymphatic and distant me-

tastases and 70 had infiltration of duodenum, stomach, and other organs. Treatment included bremsstrahlung irradiation or distant gamma therapy, using total doses of 500-8,000 rads. Reduction or disappearance of pain syndrome was observed after irradiation with 1,440 and 4,200 rads, respectively. Partial and complete tumor regressions were observed after total doses of 3,900 and 6,000 rads, respectively. Adenocarcinomas were more radioresistant than reticulosarcomas, malignant insulinomas, and small cell nondifferentiated carcinomas. The av duration of survival after the radiotherapy was 14 mo, compared with 4.5 mo after symptomatic treatment. Best results were observed after irradiation with total doses of 5,000-6,000, 6,000-7,000, or 7,000-8,000 rads; the corresponding av durations of survival were 17.6, 17.5, and 25.7 mo, respectively. (19 Refs) (In RUS)

15. POSTMORTEM FINDINGS IN PATIENTS WITH PANCREATIC CARCINOMA TREATED WITH HELIUM ION RADIATION (MEETING ABSTRACT).

Woodruff KH, Castro JR, Quivey JM, Saunders WM, Chen GT, Lyman J, Pitluck SA, Tobias RW, Walton RW, Peters TC
Lawrence Berkeley Laboratory, Berkeley, CA, 94720
Newsletter Natl Pancreas Cancer Project; VI(2):66 1981

Fifty-six patients with pancreatic carcinoma have been irradiated with helium ions with/without photons. Postmortem findings on fifteen are described to assist evaluation of charged particle radiation therapy. Most patients received at least 5000 cobalt equivalent rads of 934 MeV helium irradiation in 30 fractions over 60 days. Radiation was combined with bypass surgery in most, with 5-fluorouracil in five, and partial pancreatectomy in two. Thirteen had tumors in the head of the pancreas; two were in the body or tail. They lived from two wk to one and a half yr after completion of therapy. The immediate cause of death was sepsis or bronchopneumonia in ten patients, pulmonary emboli in two, and disseminated carcinoma in three. One had no residual tumor in the pancreas although liver metastases were present. The remainder had local tumor growth despite histologic evidence of irradiation damage. Complications of therapy could be distinguished from disease complications when radiation ports and time-dose factors were taken into account. For example, thrombi were seen to be disease complications, and gastrointestinal bleeding was attributed to radiation therapy in only one of eight instances. One patient had an infarcted left lobe of the liver, perhaps attributable to irradiation. Intestinal adhesions were difficult to evaluate since most patients had undergone abdominal surgery. There were no apparent radiation induced renal or adrenal abnormalities. Since this type of followup is valuable, attempts are being made to improve the number and quality of postmortem studies. (no Refs)

16. FAST NEUTRON IRRADIATION FOR LOCALLY ADVANCED PANCREATIC CANCER.

Smith FP, Schein PS, Wooley PV, Rogers C, Macdonald JS, Ornitz R
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Int J Radiat Oncol Biol Phys; 7(11):1527-1531 1981

The feasibility of delivering a therapeutic dose of neutrons to abdominal tumors was investigated in 20 patients with histologically documented, locally advanced, unresectable pancreatic cancer (19 adenocarcinomas, 1 islet cell cancer). The patients received 1,700-1,750 neutron rad (approx equivalent to 5,200 photon rad), either alone or with iv 5-fluorouracil (5-FU: 500 or 375 mg/square meter on the first and last 3 days of radiation therapy). Five of the 14 patients with adenocarcinoma with measurable tumor masses evidenced a partial response; four responders had received 5-FU with neutron irradiation. The patient with islet cell carcinoma had no residual tumor at surgical exploration 6 mo after neutron therapy. In nine patients, the initial site of relapse was within the irradiated region. Distant sites of relapse included the liver, lung, and extra-abdominal lymph nodes. Ten patients receiving neutrons alone or in combination with lower dose 5-FU demonstrated a moderate myelosuppression; 10 who received the higher dose of 5-FU experienced marked myelosuppression. Hematologic toxicity was prolonged, persisting for periods in excess of 1 mo in most cases and for as long as 3 mo in some. Neutron irradiation greatly reduced the hematologic tolerance of the patients to subsequent treatment with combination chemotherapy. Three of these patients required hospitalization, two with leukopenia and fever, and one with thrombocytopenia and bleeding. Other toxicities included skin erythema, nausea/vomiting, diarrhea, hemorrhagic gastritis, hepatopathy, esophagitis, colitis, and myelopathy. The median survival for all patients was 6 mo, much less than that reported with 5-FU and photon irradiation. Enthusiasm for this therapy should be reserved until clear evidence of a therapeutic advantage over photon therapy is demonstrated in controlled clinical trials. (19 Refs)

GENITOURINARY NEOPLASMS

17. TRANSCATHETER EMBOLIZATION OF ADVANCED RENAL CELL CARCINOMA WITH RADIOACTIVE SEEDS.

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J Urol; 126(5):581-586 1981

Advanced renal cell carcinoma was treated by transcatheter embolization with radioactive seeds. There were 14 patients with nonresectable or metastatic disease (Stage IV) and 8 with Stage III tumors treated. In 8 patients the tumor was implanted with radon seeds, complemented by 2,500 rad of external beam therapy, and 10 were treated by embolization with 125iodine seeds. The total dose delivered ranged from 1,600 to 14,000 rad. Several patients also had in chemotherapy. Survival was improved over previously reported studies: 13 of 22 (59%) at risk for 2 yr and 5 of 15 (33%) for 5 yr. Distant metastases did not resolve but significant local palliation was achieved. Tumor size decreased in all patients, eight of whom subsequently underwent nephrectomy. Other local effects included pain control (80%), wt gain (75%) and control of hemorrhage (80%). Toxicity was minimal and consisted of mild nausea or pain. This approach, using a low energy emitter, allows selective high dose radiation of the tumor, while sparing the adjacent normal tissues. In contrast to renal artery occlusion with inert embolic material, subsequent nephrectomy in patients with disseminated disease is not necessary. Transcatheter embolization with radioactive seeds should be considered a reasonable palliative procedure in patients with nonresectable primary renal cell carcinoma. (Author abstract) (15 Refs)

18. PREOPERATIVE WHOLE PELVIS VERSUS TRUE PELVIS IRRADIATION AND/OR CYSTECTOMY FOR BLADDER CANCER.

Batata MA, Chu FC, Hilaris BS, Lee MZ, Varesko RW, Lee HS, Visetsiri E, Kim YS, Ong R, Whitmore WF
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Int J Radiat Oncol Biol Phys; 7(10):1349-1355 1981

Between 1949 and 1974 449 patients with bladder cancer were treated by external megavoltage radiation (RT) and/or radical cystectomy. Radical cystectomy alone was used in 137 or following three preoperative RT schemes (312). True pelvis RT was used either 4,000 rad over 4 wk in 119, or 2,000 rad over 1 wk in 86, followed by radical cystectomy after av periods of 6 wk and 2 days, respectively. Whole pelvis RT, 2,000 rad in 5 consecutive days was given to 107 followed by cystectomy within 2 days. For all treatment groups, 5-yr survival rate in high-stage tumors of high histologic grade (mainly T3) was 9% in cystectomy alone vs 24-32% in those with preoperative RT. Five-yr survival rates for high-stage low-grade and low-stage high-grade tumors were 30 in the cystectomy alone group vs 39-51% in the preoperative RT groups; the more favorable response was noted in the whole pelvis RT group, which included 18% 5-yr survivals for T4 patients. Recurrence in the pelvis was reduced from 28% after cystectomy alone to 14-16% with true pelvis RT and 8% with whole pelvis RT. The reduced local recurrences, observed mainly in high sta ge or high grade tumors, was associated with tumor in low stage after RT. Metastases beyond the pelvis developed in 21-35% of the four treatment groups, indicating the inadequacy of local RT and surgery in prevention of subsequent distant spread. (7 Refs)

19. EFFICACY OF COMBINATION THERAPY WITH INTRAVESICAL INSTILLATION OF DOXORUBICIN AND LOW-DOSE RADIATION FOR BLADDER CANCER: COMPARISON WITH INSTILLATION OF DOXORUBICIN ALONE.

Kagawa S, Maebayashi K, Kurokawa K, Uyama T, Moriwaki S
Dept. Urology, Sch. Medicine, Tokushima Univ., Ehime, Japan
Urology; 18(5):478-481 1981

Intravesical instillation of doxorubicin (Adriamycin) combined with low-dose irradiation (1,600-2,000 rad) was compared with instillation of doxorubicin alone in patients with various grades of bladder cancer. Therapeutic effects were evaluated clinically and histopathologically. Clinical evaluation based on cystoscopic findings revealed an effective rate of 22 of 49 patients (45%) in the group treated with doxorubicin alone and 43 of 49 patients (88%) in the group treated with combined therapy. Histopathologic examination showed an effective rate of 3 of 49 patients (6%) when doxorubicin alone was used, whereas this rate was 16 of 49 patients (32%) with combination therapy. (Author abstract) (7 Refs)

20. COMPLICATIONS OF DEFINITIVE RADIOTHERAPY FOR CARCINOMA OF THE PROSTATE.

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Int J Radiat Oncol Biol Phys; 7(10):1341-1348 1981

Morbidity related to radiotherapy was analyzed in 267 patients treated between 1967 and 1978 and followed for at least 2 yr (av 4 yr). Between 1967 and 1977 all patients were treated with a 22 Megavolts (MV) betatron beam to a pelvic dose of approx 5,000 rad followed by boost to gradually reduced fields to a total of 6,500-7,000 rad to the prostate. Since 1977 48 patients were treated with a 20 MV or 35 MV linear accelerator using 270 degree rotational arc for the final boost; this technique eliminated the high dose area to the anterior prostate and reduced dose to the rectum. The most frequent complications were urethral stricture (14), proctitis (12), hematuria (5), urinary incontinence (4), chronic cystitis (4), and leg edema (8). The incidence of these complications was not correlated with total dose, previous transurethral resection or patient age. Pelvic lymphadenectomy was associated with a 25% incidence of leg and genital edema. Two of three patients that developed small bowel obstruction had previous laparotomies. Symptoms secondary to bladder and rectal injuries were reversible in over 50% of patients within 1 yr of onset. There was a somewhat higher percentage of patients treated with larger radiation fields who developed complications. (15 Refs)

21. THE VALUE OF EXTENDED FIELD RADIATION THERAPY IN CARCINOMA OF THE PROSTATE.

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Int J Radiat Oncol Biol Phys; 7(10):1333-1339 1981

Since 1970 a total of 342 patients received radical radiation therapy for prostate carcinoma. The overall estimated 5-and 8-yr survivals of 78% and 67%, respectively, remain unchanged. Initially all patients received single phase radiation to the prostate. Starting in 1975, extended field (two phase) radiation was used in patients with advanced cancer and in selected cases of early cancer. Comparison of results in patients with early cancer after 4 yr in 150 patients treated by single phase vs 57 treated by two phase radiation showed no significant difference in survival (78% vs 82%). However, in late stage disease (B2 and higher) there was a significant difference ($p = 0.01$) 63% vs 35% in 41 and 92 patients treated by single and two phase radiation, respectively. While the study was non-randomized, results were obtained when there had been no other change in treatment philosophy. (18 Refs)

GYNECOLOGIC NEOPLASMS

22. THE ROLE OF ADJUNCTIVE RADIOTHERAPY FOR STAGE I ENDOMETRIAL CARCINOMA: PREOPERATIVE VS POSTOPERATIVE IRRADIATION.

Chung CK, Stryker JA, Nahhas WA, Mortel R
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Int J Radiat Oncol Biol Phys; 7(10):1429-1435 1981

Eighty-five consecutive unselected patients with Stage I endometrial carcinoma (adenocarcinoma, 75; adenoacanthoma 6, adenosquamous carcinoma 4) underwent treatment with surgery alone (13), preoperative (preop) radiotherapy (RT) and subsequent surgery (33), surgery plus postoperative (postop) RT (36) or RT alone (3). Surgery consisted of abdominal hysterectomy and bilateral salpingo-oophorectomy. Preop RT was given 4-6 wk prior to, postop RT 2-4 wk following surgery. Deep myometrial invasion (outer one-third of thickness) was 6% and 28% in the preop and postop RT groups, respectively. Eleven patients developed recurrences, two in the vagina only, four in the pelvis and distant metastases, and five distant metastases only. Recurrences occurred within 24 mo in 81% and within 48 mo for all patients. Distant metastasis only developed

in Stage IB patients (lung 3, diffuse peritoneal cavity 3, liver 2, pleura 1). Five yr survival rates were surgery only 63%, preop RT 88%, postop RT 90. Two of the three RT only cases survived 2 yr. It is noted that postop RT offers the advantage of accurate surgical and pathological staging and optimal adjustment of therapy. Those with deep myometrial invasion and/or Grade 3 tumors may require systemic therapy because of the high incidence of distant failures. (27 Refs)

23. A PHASE I STUDY OF MISONIDAZOLE AND PELVIC IRRADIATION IN PATIENTS WITH CARCINOM A OF CERVIX (MEETING ABSTRACT).

Thomas GM, Rauth AM, Black BE, Cummings BJ, Sorrenti VL, Bush RS
The Ontario Cancer Institute, Toronto, Ontario, Canada
Conference on Chemical Modification: Radiation and Cytotoxic Drugs, September 17-20, 1981, Key Biscayne, Florida. Committee for Radiation Oncology Studies 139 pp., 1981.

A dose seeking Phase I study of oral misonidazole administered daily with conventional pelvic irradiation has been conducted in patients with carcinoma of the cervix Stages, IB, IIB, IIIB and IVA. Pharmacological parameters, measured for blood and urine specimens using high pressure liquid chromatography, were examined for correlation with clinically observed toxicities. Misonidazole was administered in escalating daily dosage levels to sequential groups of patients at doses of 0.15 g/M2, 0.30 g/M2 or 0.45 g/M2 for 22 days over five wk. Sixteen patients were assigned to each dose level. Using a double blind randomization they received either placebo (3/16) or misonidazole (13/16). The lowest dose level was completed and evaluated before progressing to the next level. The major dose limiting toxicity observed was peripheral neuropathy (PN). None of the 13 patients at the 0.15 g/M2 level, and 0/13 at the 0.3 g/M2 level developed PN. However, 6/13 at the 0.45 g/M2 developed mild to moderate PN. Additional patients were entered at this level and at present 8/17 have developed PN. The onset of all neuropathies occurred between the 12th day of taking drug to 10 days after drug ceased and were maximal within one wk of onset. Symptoms of PN have persisted for durations between 1 and 11 mo and to date have been completely reversible in only 3/8 patients, however in those with PN of duration greater than or equal to 3 mo significant improvement has occurred. Detailed plasma kinetics were measured on the 1st and 20th day of drug treatment. Although peak plasma misonidazole levels and half-lives of the first drug dose did not predict for development of PN, the calculated 'area under the curve' (AUC) correlated strongly with development of PN. The range of AUC's for these patients was 804 uM-hr to 2050 uM-hr. All but one patient developing PN had a AUC greater than 1000 uM-hr. To date no correlation exists between PN and total urinary excretion of misonidazole, levels of o-demethylation product or the amine of misonidazole in urine. (no Refs)

24. A MICROWAVE APPLICATOR FOR INTRACAVITARY HYPERTHERMIA OF CARCINOMA OF THE CERVIX (MEETING ABSTRACT).

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Strahlentherapie; 157(9):618 1981

Incidence of carcinoma of the cervix is increasing. Since more early-stage disease is seen now than in the past, the failure of local control is a frequent problem despite improvements in the accuracy of staging and radiotherapy planning. Hyperthermia may prove to be a useful treatment since squamous cervical tumors are thought to contain a high proportion of hypoxic cells. In early clinical studies, favorable responses have been observed in tumors treated by hyperthermia in combination with radiotherapy. We have designed microwave applicators which are compatible with the standard plastic after loading tubes used with linear cesium sources for conventional intracavitary treatment. The applicators operate at frequencies in the range of 800-1000 MHz and use a dielectric encapsulated dipole as the radiating element. In clinical use, the microwave heater will be inserted into the afterloading tube, without subjecting the patient to further trauma, approx four hr after intracavitary radiotherapy. These applicators are described, and a preclinical assessment of them, as measured in phantom materials and pigs, is discussed. (no Refs)

25. PREOPERATIVE CHEMORADIOTHERAPY FOR CARCINOMA OF THE VULVA.

Kalra JK, Grossman AM, Krumholz BA, Chen S, Tinker MA, Flores GT, Molho L, Cortes EP
Dept. Medicine, Long Island Jewish-Hillside Medical Center, Health Sciences Center, State Univ. New York, Stony Brook, NY, 11794
Gynecol Oncol; 12(2,part1):256-260 1981

We report the case of a 71-yr-old woman with advanced squamous carcinoma of the vulva who achieved marked tumor regression following therapy with 5-fluorouracil and mitomycin combined with preoperative radiotherapy. The patient underwent radical vulvectomy. On microscopic examination of the lesion, only a minute id focus of apparently viable squamous cell carcinoma with no connection to the overlying epidermis could be seen. This multidisciplinary approach for advanced carcinoma of the vulva is worthy of further exploration in a larger number of patients. (Author abstract) (14 Refs)

26. INTERSTITIAL IRRADIATION IN RECURRENT GYNECOLOGICAL CANCER.

Nori D, Hilaris BS, KimHS, Clark DG, Kim WS, Jones WB, Lewis JL
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Int J Radiat Oncol Biol Phys; 7(11):1513-1517 1981

From 1957 to 1976, 96 patients with recurrent gynecological cancers documented by biopsy underwent interstitial implantation. Group I (75 patients) had recurrent cervical cancer and Group II had various other recurrent gynecological cancers (7 endometrial, 6 ovarian, 3 vulvar, 5 others). Of the patients in Group I, 74 had epidermoid carcinoma, and one had an adenocarcinoma. Permanent interstitial implants included Ir-192 in 39 patients, Rn-222 in 12, Au-198 in 1, and I-125 in 23. Various surgical procedures were also performed and patients received post-operative external pelvic radiation. Ten patients experienced transient early complications, and five had late complications requiring surgical intervention. One yr after implantation, 34/75 (45%) were alive and disease-free after implantation and 7 patients were alive and disease-free at 5 yr after treatment. Median survival was 11 mo. Patients with disease limited to the vagina, cervix, or periurethral region had better median survival (18 mo) and 5 yr survival (31%). The 5-yr survival of patients with positive nodes was 3% and 7% for those with negative nodes. Pain relief was obtained in 36/52 patients with extensive pelvic side wall involvement and swelling improved in 7/16. In Group II, Ir-192 was used in 6 patients and I-125 in 15. No postoperative deaths occurred. The overall median survival was 11 mo, with one patient surviving over 5 yr free of disease. Favorable prognostic factors for this type of treatment are an asymptomatic recurrence detected at routine examina-

tica, vaginal recurrences, and unilateral pelvic side wall involvement. Unfavorable factors include pelvic pain with leg edema, multiple sites of recurrence in the pelvis, and positive para aortic nodes. (11 Refs)

HEAD AND NECK NEOPLASMS

27. EXTERNAL BEAM RADIATION FOR RETINOBLASTOMA.

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Bull NY Acad Med; 57(9):787-803 1981

Retinoblastoma, a malignant retinal tumor of childhood, involves both eyes in one third of cases. Untreated, it is universally fatal, but with present techniques the survival rate is 90%. The goals of treatment are preservation of both life and sight. Among the modalities presently used to treat the tumor, radiation therapy is most commonly employed, but such other techniques as diathermy, light coagulation, cryopexy, chemotherapy, surgical enucleation, and exenteration are important resources for an ophthalmic oncologist. The first case of retinoblastoma was described in 1765 by a London surgeon. In 1864 Virchow identified the tumor and called it a 'glioma of the retina'. Perhaps it was because the tumor was thought to be of glial origin (and it is known that glial tumors responded poorly to radiation) that it was not until 75 yr ago that the first retinoblastoma was successfully treated with radiation. In fact, it was not until 1926 that the term retinoblastoma was universally adopted. Since then it has been repeatedly emphasized that this tumor originates from the nuclear layers of the retina and not from glial cells As the indications, contraindications, and complexities of radiation have been learned through trial and error, the usefulness of radiation therapy for retinoblastomas has become better established. (Author abstract) (16 Refs)

28. HYPERTHERMIC TREATMENT OF RETINOBLASTOMA (MEETING ABSTRACT).

Lagendijk JJ, Schipper J
Department of Radiotherapy, University Hospital, Catharijnesingel 101, Utrecht, The Netherlands
Strahlentherapie; 157(9):620 1981

Retinoblastoma is a rare tumor arising at multiple sites in the retina of young children. The principal mode of treatment of this disease is irradiation of the entire retina. Unfortunately, there is a high rate (60%) of persisting tumor after irradiation, requiring additional therapy with light-or cryocoagulation. Hyperthermia might be a method to enhance the effectiveness of radiation on retinoblastoma. A microwave (2450 MHz) applicator for uniform heating of the entire retina and vitreous has been designed. The applicator has been tested on rabbit eyes (in vivo) and on eye phantoms. The measured temeperature distributions satisfied the requirements. It is possible with this applicator to heat the posterior or the anterior part of the eye uniformly to the desired temperatures. In April 1981, two eyes were heated with this technique, one eye with a retinoblastoma recurrence in the anterior part of the eye and one eye with a multiple retinoblastoma recurrence in the retina. The eyes were treated with low doses of radiation followed by hyperthermia up to 44 C for one hr. A detailed prescription of the treament will be given. With both patients the tumor is in regression. No definitive results can be given at this moment. No severe irreparable damage is seen in either of the patients. No cataract has been induced by heating the lens to 44 C for one hr, this being in agreement with our results obtained in the investigation of the cataractogenic temperature of rabbit eye-lenses. The heating technique is also suitable for the hyperthermic treatment of other intra-ocular tumors, particularly intra-ocular melanoma. (no Refs)

29. INTERSTITIAL GAMMA THERAPY OF CANCER OF THE MOUTH MUCOSA.

Vorob'ev IuI, Garbuzov MI
N. A. Semashko Medical Dental Inst., Moscow, USSR
Med Radiol (Mosk); 26(10):3-7 1981

The therapeutic efficacy of interstitial gamma therapy was studied in 94 patients (67 men, 27 women; mean age, 59.1) with cancer of the mouth mucosa. Twenty-five patients in Stages I-II received applications of 60Co needles alone (5,500-6,500 rads in 5.5-6.5 days), and 69 in Stage III received interstitial gamma therapy (3,000-3,500 rads in 3-3.5 days) after distant gamma therapy (4,500-6,000 rads in 4.5-6 wk). Only two patients developed radiation osteomyelitis. The 3-yr survival rates were 47% for the patients with cancer of the mouth floor, 55.5% for those with cancer of the buccal mucosa, 58.3% for those with tongue cancer, and 87.5% for those with lower lip cancer. (16 Refs) (In RUS)

30. T4N0M0 GLOTTIC CANCER: AN ANALYSIS OF DOSE-TIME VOLUME FACTORS.

Harwood AR, Beale FA, Cummings BJ, Keane TJ, Payne D, Rider WD
Dept. Radiation Oncology, Princess Margaret Hosp., Toronto, Ontario, Canada
Int J Radiat Oncol Biol Phys; 7(11):1507-1512 1981

The influence of irradiation dose, field size, age, and extent of disease on the local control of glottic cancer that had extended beyond the confines of the larynx to either the thyroid cartilage, trachea, hypopharynx, or tongue (T4NOMO) was investigated. The 56 patients treated with radical radiotherapy with surgery for salvage between 1965 and 1977 were divided into two groups: T4 pyriform all had involvement of the hypopharynx with or without involvement of cartilage (14 patients); T4 cartilage had cartilage destruction and involvement of the trachea and base of the tongue (42 patients). The overall local control rate for the entire group was 56%. Local control was 67% in the T4 cartilage group at 5 yr compared with 19% in the T4 pyriform group. Actuarial local recurrence free rate at 5 yr was 42% for patients receiving less than 1,700 rad-equivalent therapeutic (ret) nominal standard dose (NSD) while it was 82% for those receiving more than 1,700 ret NSD. No difference in local control by irradiation was seen with different ages of patients or differing radiation field sizes. It was concluded that radical radiotherapy with surgery for salvage is a good method of treatment for T4 glottic cancer, particularly those who do not have hypopharyngeal involvement, and a minimum dose of 1,700 ret is necessary to achieve adequate local control by irradiation. (14 Refs)

31. T2 GLOTTIC CANCER: AN ANALYSIS OF DOSE-TIME-VOLUME FACTORS.

Harwood AR, Beale RA, Cummings BJ, Keane TJ, Rider WD

Dept. Radiation Oncology, Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada

Int J Radiat Oncol Biol Phys; 7(11):1501-1505 1981

A retrospective analysis of 244 patients with T2NOMO glottic cancers (extension to the subglottic and/or supraglottic regions with normal or impaired mobility, without evidence of nodal disease or distant metastases) treated with radiotherapy between 1965 and 1977 was conducted. All patients received radical radiotherapy with megavoltage irradiation using 60Co with doses ranging from 5,000 rad in 4-5 wk to 5,000 rad in 5 wk; surgery was reserved for salvage following failure of radiotherapy. If the vocal cord was mobile, local control by radiotherapy was achieved in 80% at 5 yr, compared with 53% if the vocal cord mobility was impaired. A small improvement in local control was observed with a field size of 36 square cm or more, but the difference was not statistically significant. Local control improved significantly when a nominal standard dose (NSD) of greater than 1,650 rad equivalent therapeutic (ret) was used (5,000 rad in 4 wk in 20 fractions or more) is compared to 1,649 ret or less (5,000 rad in 5 wk or less). An NSD of less than 1,650 ret provided poorer local control than an NSD of 1,650-1,750 ret. Age was not a factor in local control by radiotherapy. Local control in 21 females was 85% compared with 68% in 221 males. The improved local control in females was seen entirely in the mobility impaired group (83% local control in females vs 50% in males). Four patients recurred in the neck as the first site of recurrence without a recurrence of the primary. A dose curve for T2 glottic cancer was derived and compared to previously obtained dose curves for T1 and T3 glottic cancer and the dose complication curve for the larynx. Optimal dose-time-vol factors for T2 glottic cancer were discussed. (12 Refs)

32. RADIOTHERAPY WITH 192IRIDIUM ON A SHAPED APPARATUS IN THE TREATMENT OF THE HARD PALATE TUMORS.

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Minerva Med; 72(43):2889-2894 1981

Between 1973-1977, seven patients (2 female and 5 male, 52-72 yr old) had hard palate spinocellular carcinomas. They were treated by irradiation delivered through a shaped apparatus, loaded with 192iridium wires, adjusted for each case. Doses were 1,000-1200 rad/day with a total 6,000-7,000 rad in 5-7 days. Severe mucositis followed the irradiation in the first four patients. Lead shield was used in the others, with mucositis reaching the peak 10-15 days after radiotherapy, gradually diminishing and disappearing 45-60 days later. Complete regression was observed in 6 cases. In one case after initial modest regression, tumor spread rapidly and patient died a few mo later. In another case, which was cured locally, 6 mo later lymphonodal submandibular metastases appeared, resisted treatment and the patient died without reappearence of tumor at the primary site. (19 Refs) (In ITA)

33. RADIOTHERAPY AND BLEOMYCIN-CONTAINING CHEMOTHERAPY IN THE TREATMENT OF ADVANCED HEAD AND NECK CANCER: REPORT OF SIX PATIENTS AND REVIEW OF THE LITERATURE.

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Int J Radiat Oncol Biol Phys; 7(10):1441-1450 1981

Six case histories are presented of patients with advanced head and neck cancer treated with bleomycin (BLM) and cisplatinum (CP) and simultaneous radiation therapy (RT). BLM (15 mg im) was given 3x in 1 wk 30-60 min before RT with conventional fractionation (180-200 rad/fraction, 5x/wk). At variable intervals during interruptions in BLM + RT for healing of mucocutaneous reactions, patients received CP 40 mg/square meter once weekly. All patients experienced mucositis within radiation ports; there were also three episodes of infection, and marked myelosuppression in one patient. CP resulted in mild, transient serum creatinine elevation in four patients. Therapy was discontinued in three cases because of s evere toxicity. Only one patient with widespread carcinoma in situ of the palate achieved a complete remission; malignant cervical adenopathy had previously been resected. At 1 yr follow-up, this patient is the only one alive without evidence of disease. Four other patients had partial shrinkage of disease. Review of the literature has shown other investigators also experienced marked toxicity with the use of similar BLM and RT fractionation. A possible therapeutic advantage of combined therapy compared to RT alone has not been established in four randomized trials reviewed. (34 Refs)

34. CAROTID ARTERY DISEASE FOLLOWING EXTERNAL CERVICAL IRRADIATION.

Elerding SC, Fernandez RN, Grotta JC, Lindberg RD, Causay LC, McMurtrey MJ

(c/o McMurtrey), M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX, 77030

Ann Surg; 194(5):609-615 1981

A retrospective study of 910 patients surviving at least 5 yr after cervical irradiation for Hodgkin's disease, non-Hodgkin's lymphoma, or primary head and neck neoplasms showed the incidence of stroke following cervical irradiation was 63 of 910 patients (6.3%) during a mean period of observation of 9 yr. This represents a trend toward an increased risk for this population over the expected incidence of 38 strokes for a matched population observed over the same period of time ($p = 0.39$). A prospective study of 118 similar patients currently living 5 yr after cervical radiotherapy was performed to determine the incidence of carotid artery disease occurring as a consequence of neck irradiation. Abnormal carotid phonoangiograms (CPA) were found in 25% of the patients and abnormal oculoplethysmographs (OPG) were found in 17%. These studies represent significant carotid lesions that are not expected in such a population. It is concluded that the carotid stenoses demonstrated are most likely a consequence of prior irradiation. Patients that are 5-yr survivors of cervical irradiation should have noninvasive vascular laboratory studies performed as part of their routine follow-up examinations in order to detect these carotid lesions while they are occult. (Author abstract) (41 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

35. NON-HODGKIN'S MALIGNANT LYMPHOMAS OF UPPER DIGESTIVE AND RESPIRATORY TRACTS.

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Int J Radiat Oncol Biol Phys; 7(10):1419-1427 1981

Radiation therapy (RT) was given to 91/102 patients with non-Hodgkin's lymphoma involving the upper digestive and respiratory tracts. RT was given to 62 at sites of involvement only; 29 received elective RT of contiguous uninvolved areas. Other prior treatment included surgery (3) and chemotherapy (8). Complete remissions (CR) were obtained in 72/82 Stage I and II patients. Of the nine initial failures, no correlation was found to site of origin or histology, although most were bulky lesions. Among the 72 with CR, 36 relapsed during the first yr. Av survival was 14 mo for all stages. Survival at 5 yr was 28% for Stage I and 12% for Stage II. According to the Rappaport classification, those with the histiocytic poorly differentiated tumors had a poorer prognosis than the other types. With the Lukes and Collins classification, small and large cleaved lymphomas did significantly better than large non-cleaved, immunoblastic and small cleaved lymphomas ($p = 0.006$). According to the Lennert classification, low grade lymphomas had a significantly longer tumor-free period than high grade lymphomas. Radiation doses between 4,000 and 5,000 rad also showed a longer tumor-free period compared to lower doses. Adjuvant chemotherapy is recommended in Stages I and II after primary RT because of the high rate of primary relapse in distant sites. (21 Refs)

36. TOTAL-BODY IRRADIATION IN ADVANCED NON-HODGKIN'S LYMPHOMA.

Dobbs HJ, Barrett A, Rostom AY, Peckham MJ
Inst. Cancer Res., Royal Marsden Hosp., Downs Road, Sutton, Surrey, England
Br J Radiol; 54(646):878-881 1981

Thirty-seven patients with advanced non-Hodgkin's lymphoma who were treated by total-body irradiation (TBI) at the Royal Marsden Hospital are reviewed. Twenty-four patients had received no previous therapy; 13 patients were in relapse. The overall response rate was 73% for nodular lymphomas and 80% for those with diffuse disease. The duration of complete response ranged from two to 41 mo (median 12 mo). Subsequent chemotherapy was given successfully except in patients with prolonged thrombocytopenia which appeared to be related to an initially involved bone marrow. Hemibody irradiation (HBI) was the least myelosuppressive form of TBI and is now being used in complete remission following chemotherapy. (Author abstract) (8 Refs)

37. THYMIC CYSTS FOLLOWING RADIATION THERAPY FOR HODGKIN DISEASE.

Baron RL, Sagel SS, Baglan RJ
Dept. Radiology, Hosp. Univ. Pennsylvania, Philadelphia, PA
Radiology; 141(3,part1):593-597 1981

In three patients, benign thymic cysts developed following radiation therapy for Hodgkin disease. Autopsy or surgical specimens provided a diagnosis in all three cases; computed tomographic (CT) scans obtained in two of the patients provided a preoperative diagnosis. The etiology of these cysts is uncertain; they may arise following successful radiation treatment of Hodgkin disease involving the thymus. When an anterior mediastinal mass develops in a patient with Hodgkin disease following radiation therapy, careful evaluation to exclude a benign process is indicated prior to initiating additional therapy. (Author abstract) (11 Refs)

38. X-RAY EVALUATION OF CARDIAC FUNCTION DURING RADIOTHERAPY OF HODGKIN'S DISEASE.

Shapiro IB
Res. Inst. Medical Radiology, Obninsk, USSR
Med Radiol (Mosk); 26(9):27-30 1981

Cardiac function was studied in 169 patients (84 men, 85 women; aged less than 20 to 60 yr) with Hodgkin's disease. Group I patients (98) received irradiation of the mediastinum at total doses of 4,000-4,500 rads, Group II (28) received irradiations of the mediastinum at total doses of 2,000 rads, Group III (22) received irradiations of the cervical subclavicular, and axillary lymph nodes at total doses of 2,000-4,000 rads, and Group IV (21) received polychemotherapy. All patients underwent electrokymography before, in the middle of and 2-6 mo after the period of radiotherapy. Decrease in heart size was observed in 46% of the Group I patients, 21% of the Group II, and 19% of the Group IV; the decrease was more pronounced in those patients who did not have enlargement of mediastinal lymph nodes. Irradiation of the mediastinum decreased heart contractility: the changes in the electrokymograms were observed in 35% of the Group I patients, 18% of the Group II, and 18% of the Group III. (11 Refs) (In RUS)

39. SECOND MALIGNANT NEOPLASMS IN PATIENTS TREATED FOR HODGKIN'S DISEASE WITH RADIOTHERAPY OR RADIOTHERAPY AND CHEMOTHERAPY.

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Cancer; 48(11):2386-2393 1981

The incidence of second malignant neoplasms (SMN) was assessed in 248 patients with Hodgkin's disease (HD) treated by radiotherapy alone (XRT) or in combination with chemotherapy (XRT + C) between January/1960 and June/1977. Radiation therapy was categorized as less than extended field (less than EF), extended field (EF) or total nodal irradiation (TNI). Chemotherapy was scored as single agent (SAC) or multiagent (MAC). MAC consisted primarily of either nitrogen mustard, vincristine, prednisone and procarbazine (MOPP) or cyclophosphamide, vinblastine, procarbazine and prednisone (CVPP). Ten metachronous malignancies occurred 1-21 yr (median 10 yr) after the diagnosis of HD. With a median follow-up of 6 yr the observed-to-expected ratio (O/E) was 4.2 for XRT alone and 7.6 for XRT + MAC. For 46 patients with greater than or equal to 10 yr follow-up (median 13 yr) the O/E ratio was 16.1 for XRT and 26.5 for XRT + MAC. All SMN occurred in patients who had not had a splenectomy at or prior to the time of HD diagnosis. Only four of nine solid SMN were within treatment portals or near portal margins. The diagnosis of another malignant neoplasm was made prior to or simultaneous with the diagnosis of HD in four additional patients. This observation, and the occurrence of five of six SMN outside of the treatment field in the XRT alone group, suggests that there may be factor(s) associated with the incidence of SMN in HD in addition to treatment itself. (Author abstract) (25 Refs)

40. TREATMENT OF STAGE I AND II MEDIASTINAL HODGKIN DISEASE. A COMPARISON OF INVOLVED FIELDS, EXTENDED FIELDS, AND INVOLVED FIELDS FOLLOWED BY MOPP IN PATIENTS STAGED BY LAPAROTOMY.

Rosenmeister FB, Fuller LM, Sullivan JA, North L, Velasquez W, Conrad FG, McLaughlin P, Butler JJ, Shullenberger CC
Dept. Internal Medicine, Section Hematology, M. D. Anderson Hosp. and Tumor Inst., Univ. Texas System Cancer Center, 6723 Bertner Ave., Houston, TX, 77030
Radiology; 141(3,part1):783-789 1981

Three treatment programs for Stage I and II mediastinal Hodgkin disease (established by laparotomy) were compared. Involved-field radiotherapy plus MOPP gave a disease-free survival rate of 97%, significantly different from 62% and 55% for involved and extended fields, respectively. Corresponding survival figures of 97%, 88%, and 84% were not significantly different statistically due to salvage with radiotherapy and/or chemotherapy. Among patients given radiotherapy alone, the survival figure of 94% for limited mediastinal disease was significantly better than 63% for extensive mediastinal and hilar disease; corresponding disease-free figures of 72% and 35% were also significantly different. Constitutional symptoms were an important prognostic factor in disease-free survival following the use of involved fields; hilar disease was important only with large mediastinal masses. Most relapses were intrathoracic; MOPP alone salvaged only 47%. Treatment of Stage I and II Hodgkin disease should be based on symptoms, extent of mediastinal disease, and hilar involvement. (Author abstract) (26 Refs)

41. ETIOLOGY OF PERICARDIAL EFFUSION FOLLOWING RADIATION THERAPY OF HODGKIN'S DISEASE (MEETING ABSTRACT).

Kurtz B, Maisch B, Vob AC
Medizinische Klinik Tubigen, Tubingen, W. Germany
Strahlentherapie; 157(9):571 1981

Radiation doses delivered to the anterior pericardium between 1969 and 1979 were ascertained in 16 patients with Hodgkin's disease, in whom pericardial effusions had developed after multiple-field therapy using 5 ventral fixed fields to the mediastinum as a supra-diaphragmatic primary treatment. The appearance of effusions was directly dependent on the dosage, if doses between 53 and 128 Gray had been delivered; in such patients, seriousness of the clinical symptoms was related to the importance of the dose delivered to the anterior pericardium. Control groups consisted of two collectives comprising 9 patients with primary pericardial affection due to Hodgkin's disease, and 11 comparable further patients without complications after mantle treatment; in these collectives, one case in the second group excepted, antisarcolemmal antibodies were not observed. On the other hand, these antibodies could be detected in 5 out of 11 patients with Hodgkin's disease who suffered from pericardial complications following radiation therapy. Possible diagnostic and pathogenetic significance of the present findings is discussed. (no Refs)

42. WHOLE BODY ELECTRON THERAPY IN MYCOSIS FUNGOIDES.

Mandelzweig Y, Kuten A, Tatcher M, Yudelev M, Cohen Y, Robinson E
Dept. Oncology, Rambam Medical Center, Technion, Haifa, Israel
Harefuah; 100(10):452-454,500 1981

Mycosis fungoides, a disease that can involve large areas of the body surface, is frequently treated by whole body electron irradiation. Two major technological problems are encountered in such therapy: uniform delivery of radiation to a layer 10 to 15 mm deep all over the body, and avoidance of contamination of the beam by Bremsstrahlung x-rays, which are a product of interactions between electrons in the beam and the matter between the patient and the electron source. Commonly, in whole body electron therapy, large treatment fields are produced by irradiating the patient with 3-5 MeV electrons at a distance of approx 3 to 4 meters from the electron source. The Phillips SL 75/10 Linac used in the present study produces a max intensity of only about 10 rad/min, using a standard 4 MeV electron beam. The x-ray contamination, however, increases from a tolerable value below 2% at 1 meter to an unacceptable value of about 8%. The Linac cannot, therefore, be used for this long distance procedure; however, an alternative method is to use a shorter electron beam and to scan the surface of the body. There are no modifications or special equipment needed for the Linac when thus used, and the alternative procedure solves both of the technological problems mentioned earlier. (18 Refs) (In HEB)

MUSCULOSKELETAL NEOPLASMS

43. ASSESSMENT OF IN VIVO EFFECTIVENESS OF TUMORICIDAL CHEMOTHERAPY AND RADIATION THERAPY BY SERIAL ANALYSIS OF TUMOR-ASSOCIATED URINARY ANTIGEN TITERS IN PATIENTS WITH SARCOMA.

Huth JF, Gupta RK, Morton DL
Div. Oncology, Dept. Surgery, Univ. California Sch. Medicine, 54-140 CHS, Los Angeles, CA, 90024
Cancer Treat Rep; 65(11/12):1037-1042 1981

Serial measurements of tumor-associated antigens in the urine of patients with sarcoma who received preoperative intra-arterial doxorubicin and radiation therapy were assayed by microcomplement fixation. Changes in urinary antigen titer as a result of therapy were compared to pretreatment samples and were correlated with clinicopathologic evidence of in situ tumor cell destruction. Of the 53 patients with sarcoma studied, 44 had clinicopathologic evidence of tumor destruction induced by the preoperative therapy, and all 44 had a fourfold or greater rise in the level or urinary antigens during the treatment period. The other nine patients had no evidence of tumor destruction and antigen titers remained unchanged. Results suggested that tumoricidal therapy released tumor-associated antigens which could be detected in urine by microcomplement fixation. This phenomenon may be useful for measuring the in vivo effectiveness of tumoricidal therapy on nonaccessible tumors. (Author abstract) (8 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

44. A CONTROLLED CLINICAL TRIAL OF MISONIDAZOLE IN THE RADIOTHERAPY OF PATIENTS WITH CARCINOMA OF THE BRONCHUS (MEETING ABSTRACT).

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Marie Curie Research Wing for Oncology, Regional Radiotherapy Center, Mount Vernon Hospital, Northwood, Middlesex HA6 2RN, England
Conference on Chemical Modification: Radiation and Cytotoxic Drugs, September 17-20, 1981, Key Biscayne, Florida. Committee for Radiation Oncology Studies 139 pp., 1981.

It was decided to start a double-blind randomized controlled clinical trial in carcinoma of bronchus, using a 6 fraction technique of radiotherapy with or without misonidazole. The patients included in the study were patients with squamous and large-cell undifferentiated carcinoma of the bronchus who were unsuitable for surgical resection, but where there was no evidence for metastases beyond the thorax. A total of 62 patients were randomized. The patients were observed clinically at monthly-intervals when a chest x-ray was taken and the sputum examined for malignant cells. Tomography was performed at two-monthly intervals and a particular effort was made to obtain post mortem examinations. Fifty-two of the patients included have now died and post mortems were obtained in 70%. Thirty-three of the 62 patients were randomized to receive misonidazole and of these 14 showed peripheral neuropathy. No significant benefit was obtained with the use of misonidazole. The full observation of those patients now dead showed that using the 6 fraction technique of radiotherapy a complete tumor control was obtained in only one patient and in this case histological review suggested the tumor was an oat-cell carcinoma. It was further found that the primary tumor was the chief cause of death in 75% of these patients. In a considerable number of post mortems no evidence for distant metastases could be obtained. It was concluded that these patients presented far advanced tumors where the control of oxic, let alone hypoxic, cells presented great problems and that the situation was probably too advanced for a hypoxic cell sensitizer to yield benefit. The trial did show that in a carefully selected group of patients the control of the primary tumor was important and that further efforts should be made to eradicate tumor. (no Refs)

45. LONG TERM SURVIVORS WITH SMALL CELL CARCINOMA OF THE LUNG.

Peschel RE, Kapp DS, Carter D, Knowlton A
Dept. Therapeutic Radiology, Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT, 06510
Int J Radiat Oncol Biol Phys; 7(11):1545-1548 1981

A retrospective review of all patients with small cell carcinoma (SCC) of the lung, diagnosed between 1970 and 1978, who survived a minimum of 2 yr at both Yale-New Haven Hospital (YNHH) and the Hospital of Saint Raphael (HSR) wes conducted. Of 245 patients diagnosed, 21 survived 2 yr or more, 17 of whom had an unequivocal diagnosis of SCC. The patients were initially divided into two groups: those with local-regional disease (LD) confined to the hemithorax, and those with extensive disease (ED) with metastases outside the hemithorax. The patients' treatment was divided into two types: low dose lung irradiation (LDLI) consisting of total doses of 2,500-3,500 rad given in daily fractions of 200-300 rad, and high dose lung irradiation (HDLI) usually given in a split course method with total doses of 4,800 rad or more in daily fractions of 200-300 rad. Twelve of the 17 patients had no evidence of disease (NED) at 2 yr, four of whom had documented relapses. The overall NED survival continued to decrease beyond the 2 yr follow-up. A second primary developed in two patients. Long term local control appeared superior in patients who survived 2 yr NED if radical local therapy (either HDLI or surgery) was given compared to LDLI. The impact of initial chemotherapy and prophylactic brain irradiation could not be assessed because of the small number of patients. Of the five patients who were alive with disease at 2 yr, one was never disease free, the site of first recurrence was in the lung in three after LDLI and one patient given HDLI relapsed in the CNS only. (14 Refs)

46. RADIATION THERAPY FOR SUPERIOR VENA CAVAL SYNDROME DUE TO LUNG CANCER.

Slawson RG, Prempree T, Viravathana T, Kim IS, Scott RM
Martha V. Filbert Radiation Center, Univ. Maryland Hosp., Baltimore, MD, 21201
Md State Med J; 30(11):68-70 1981

The results of radiotherapy in 64 patients with superior vena caval syndrome (SVC) due to lung cancer are reported. Histologically, 23 patients had squamous cell carcinoma, 20 had oat cell carcinoma, 14 had adenocarcinoma, and 1 had large cell undifferentiated carcinoma (histology of the tumor was not specified in 6). The patients received irradiations from opposed anterior-posterior fields (2,000-3,000 rads in 1-2 wk or 800-1,000 rads in 1-3 fractions at weekly intervals). Complete disappearance of SVC was observed in 55/64 patients, 4 showed partial response, and in 5 radiotherapy was ineffective. An overall mean survival was 7.2 mo (13.5 mo for the patients treated with radical split-course radiotherapy). (9 Refs)

INSTRUMENTATION AND TECHNOLOGY

47. PROSPECTS FOR COMPUTED TOMOGRAPHY IN RADIATION THERAPY.

Wizenberg MJ
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CT; 5(3):283-287 1981

Computed tomography (CT) can provide crucial information regarding stage and extent of tumor. Such information has led to substantial changes in proposed treatment plans, particularly for tumors located in the torso. Improved resolution of CT scans resulting from thinner slices, more rapid scan times, and improved algorithms have made possible significant advances in the ability to determine extent of disease. CT scans have regularly demonstrated more extensive disease than had previously been appreciated; their use in staging should result in a more meaningful comparison of results obtained by radiation therapy or surgery. CT scans used in follow-up offer comparable accuracy and can be used to judge the efficacy of treatment and as a guide to subsequent therapeutic decisions. Dose delivery and therapeutic ratio, pinpointing tumor location, identifying and correcting for tissue inhomogeneities, three-dimensional treatment planning, treatment planning with contemporary scanners, and cost-effectiveness of CT-based treatment planning are discussed. (34 Refs)

48. CT SCANNING AND INTERSTITIAL THERAPY.

Elkon D, Kim JA, Constable WC
Div. Radiation Oncology, Univ. Virginia Hosp., Charlottesville, VA, 22908
CT; 5(3):268-272 1981

The role of computerized tomography (CT) in interstitial radiotherapy is reviewed. CT scanning is useful for definition of deep seated tumor location and extent prior to interstitial therapy. Tumors which may otherwise be difficult to visualize and are better defined by CT scanning include those in the head and neck region and in the female genital tract, urologic tumors, lung carcinoma, and gastrointestinal tumors. CT scanning may be used for localization of radioactive sources and/or afterloading devices after implantation for dose calculation. Streak artifacts caused by high density seeds such as 198Au or 192Ir have not hindered determination of their location by CT scan. Metal needles and wires such as Ra and Cs cannot be adequately visualized on CT, but the dose distribution obtained from orthogonal films may be superimposed on the anatomic extent of the tumor as defined by CT. CT scanning may be used to quantitatively measure tumor response to therapy. Evidence of regression or metastasis has been shown by CT scan of tumor areas that could not otherwise be evaluated. (9 Refs)

49. USE OF COMPUTERIZED TOMOGRAPHY IN DOSE CALCULATIONS FOR RADIATION TREATMENT PLANNING.

Mohan R, Chui C, Miller D, Laughlin JS
Dept. Medical Physics, Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
CT; 5(3):273-282 1981

Computerized tomography (CT) has enabled improvement in the accuracy of dose distribution calculations for radiation treatment. Methods for radiation dose calculation are described, including the equivalent path length method, Batho's method and variations, and the equivalent tissue-air ratio method. Density distributions in a CT scan are obtained with x-rays of much lower energy than those of the therapeutic range; it is thus necessary to transform CT numbers to numbers that are proportional to the relevant electron densities. Interpretation of CT numbers is discussed and a CT-based treatment planning system is presented. (20 Refs)

50. FIVE-YEAR RESULTS OF RADIOTHERAPY UNDER HYPERBARIC OXYGENATION IN CANCER PATIENTS.

Kiseleva ES, Dar'ialova SP, Volkova MA, Kuznetsova IP, Falileeva EP, Kvasov VA, Zvekotkina LS, Pitskhelauri VG, Sukirko VA, Boiko AV
P. A. Hertsen Res. Oncological Inst., Moscow, USSR
Med Radiol (Mosk); 26(9):3-11 1981

The efficacy of radiotherapy under hyperbaric oxygenation (HBO) was evaluated in 564 patients with various malignant tumors. Of 94 patients with inoperable lung cancer, 68 received radiotherapy (600 rads/fraction, 2x/wk, total dose 4,200-5,400 rads) under HBO and 26 were irradiated in air; the av duration of survival after the radiotherapy under HBO was 15.7 mo, compared with 9.6 mo after the radiotherapy in air. The 5-yr survival in osteogenic sarcoma patients irradiated under HBO (600 rads/fraction, 3x/wk, total dose 9,000-12,000 rads) was 21.4%, compared with 7.3% after radiotherapy in the air. When distant gamma therapy (400 rads/fraction, 3x/wk, total dose 1,600-2,800 rads) under HBO was carried out in patients with cervical carcinoma: the 5-yr survival rate was 70.9%, compared with 72.7% after irradiation in air. Of 158 patients with neoplasms of the oral cavity, 81 received radiotherapy under HBO and 77 were irradiated in air; 5-yr survival rates were 30% and 10.5%, respectively. The 5-yr survival rates in patients with soft tissue neoplasms were 53% after radiotherapy under HBO and 29% after radiotherapy in air. (10 Refs) (In RUS)

51. LOCALIZED HYPERTHERMIA ADJUVANT TO IRRADIATION IN SUPERFICIAL RECURRENT CARCINOMAS: A PRELIMINARY REPORT ON 46 PATIENTS.

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Dept. Radiation Therapy and Nuclear Medicine, Thomas Jefferson Univ. Hosp., Philadelphia, PA, 19107
Int J Radiat Oncol Biol Phys; 7(10):1457-1463 1981

Combined external microwave (2,450 megaHertz) therapy plus surface heating using a bag with circulating deionized water at 42-44 C has been used in 46 patients (19 males, 27 females) for treatment of superficial recurrent carcinomas. Temperature within a lesion was obtained by insertion of a probe immediately after the microwave generator was turned off. Intralesional temperatures of 41 C have been maintained to depth of 3.0 cm, while most superficial tumor nodules (0 to 2.0 cm) can achieve a temperature of 42.5-43.5 C. Heat is maintained for 30-40 min twice weekly for 6-8 sessions. Adjuvant electron beam r adiation of 600-800 rad/wk is used for 3-4 wk. The combined treatment in 36 evaluable patients has resulted in a 50% complete response rate. Highest responses (8/15) were achieved among recurrent superficial tumors masses secondary to chest wall breast adenocarcinoma and within deposits of melanoma. Results of this pilot study are sufficiently encouraging to plan for treatment of advanced, inoperable primary tumor in which less than 50% local control is achievable with all existing modalities (chemotherapy and radiation). (12 Refs)

52. CLINICAL RESULTS OF WHOLE BODY HYPERTHERMIA (WBHT) (MEETING ABSTRACT).

van der Zee J, Van Rhoon GC
Department of Experimental Radiotherapy, Erasmus Universiteit Rotterdam, Rotterdam, The Netherlands
Strahlentherapie; 157(9):624 1981

Whole body hyperthermia is clinically performed with the 'adapted Siemens Cabin'. At the moment 23 patients have received one, two or three whole body hyperthermia treatments with a minimum temperature dose of 2 hr at 41.5-42.0 C. Tumors include 3 mammary carcinomas, 4 bronchial carcinomas, 2 melanomas, 4 sarcomas, 5 gastrointestinal, 2 pleural, 1 cervical and 2 adenocystous carinomas, all inaccessible to local hyperthermia. WBHT is given alone or in combination with either chemotherapy or radiotherapy. The results of WBHT alone or in combination with chemotherapy (melphalan 25 mg or 5-fluorouracil 10 mg/kg body wt) are meager: even though objectively, growth delay or minimal regression was seen in 11/11 patients. The results of WHBT with radiotherapy are, however, promising. In two patients the effect of a small dose of radiotherapy plus WBHT compares favorably with the effect of previously given high dose of radiotherapy. This demonstrates clearly the additional effect of hyperthermia. A response rate of 70% (5/7) was obtained with a group of patients who received the low dose of about 20 Gray (Gy) in conjunction with 1-3 whole body hyperthermia treatments. (Similar results were obtained with about 20 Gy radiotherapy and local hyperthermia, in 10/13 superficial tumors). This treatment schedule can, therefore, successfully be applied to patients with recurrence following earlier radiotherapy or those with exten-

sive local tumor growth, without unacceptable normal tissue damage. Whole body hyperthermia in combination with radiotherapy should be regarded as a local treatment, limited to the radiation field. The effect upon distant metastases is negligible. In our group of patients there are no indications that whole body hyperthermia at 41.8 C stimulates distant metastases. (no Refs)

53. A LOCALIZED CURRENT FIELD HYPERTHERMIA SYSTEM FOR USE WITH 192-IRIDIUM INTERSTITIAL IMPLANTS.

Astrahan MA
University of California, Los Angeles, CA, 90024
Diss Abstr Int [B]; 42(4):1288-B 1981

Recent experimental and clinical evidence indicates that the adjunctive use of l ocalized hyperthermia (temperatures in the range 41 C to 44 C) may potentiate the effectiveness of low dose rate radiation on tumors. One form of low dose rate radiotherapy is the 192Ir interstitial implant. The problem I addressed was to design, build, and evaluate a system for heating a tumor vol, defined by the interstitial implant, to a uniform hyperthermic temperature. The soln I propose is a localized current field (LCF) hyperthermia system employing 500 KHz electric current conducted through the tissue between electrodes. The steel needles of the 192Ir implant are used as the LCF system's electrodes. These needles may also be used for the insertion of thermistor probes throughout the treatment region for feedback temperature regulation. (no Refs)

54. BENEFICIAL THERAPEUTIC RATIO OF LOCAL HYPERTHERMIA IN ASSOCIATION WITH RADIOTHERAPY OR CHEMOTHERAPY (MEETING ABSTRACT).

Bey P, Marchal C, Metz R, Hoffstetter S, Gaulard ML, Escanye JM, Robert J
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Strahlentherapie; 157(9):615 1981

Thirty-eight patients with several superficial metastatic tumors were treated by hyperthermia (41-45 C) induced by 1 to 3 MHz ultrasound or by 434 MHz microwaves. Thermometry was performed by means of iron-constantan thermocouples placed in intra or subtumorally inserted catheters, or by measuring the skin thermal level. Tumor response was assessed by measuring tumor vol. A comparison of treatment response rate is made between heated and unheated nodules to appreciate an eventual beneficial therapeutic ratio. Fifty tumors were submitted to hyperthermia alone or in combination with radiotherapy or chemotherapy. Out of 290 ultrasound hyperthermia sessions only three superficial skin burns have been noted; three others were observed out of 170 microwave hyperthermia treatment sessions. A vol regression of more than 50% was observed in 3 out of 14 tumors treated by hyperthermia alone, 2 out of 8 tumors treated with the association of chemotherapy and 17 out of 28 tumors treated with the association of radiotherapy. (no Refs)

55. FOUR YEARS EXPERIENCE WITH HYPERTHERMIA AND RADIATION IN CLINICAL PRACTICE (MEETING ABSTRACT).

Arcangeli G, Cividalli A, Lovisolo G
Istituto Medico e di Ricerca Scientifica, 00191 Rome, Italy
Strahlentherapie; 157(9):614 1981

Since 1976, hyperthermia has been employed in our institution in combination with radiation for treating several types of tumors according to two main different protocols. The first series of 51 patients with 111 neck node metastases from head and neck cancer were irradiated with a multiple daily fractionation scheme consisting of 3 daily fractions of 2 + 1.5 + 1.5 Gray (Gy)/day, 4 hr interval between fractions, 5 days/wk, up to an av total dose of 60 Gy. Heat was delivered at a temperature of 42.5 C, for 45 min, qod, immediately after the 2nd daily fraction. About half of these patients received also misonidazole (MIS) 2 hr before the first daily fraction at a dose of 1.2 g/m2, up to a total of 12 g/m 2. Local control rate appeared to be much higher in patients treated with multimodality protocols, especially when also heat was employed. In these cases, a complete clearance was obtained in more than 75% lesions. This response remained almost constant for the whole follow-up period (18 mo). No increased skin radiation reaction was observed. The second series consisted of 20 patients with several types of radioresistant tumors, including skin melanoma nodules or lymph node metastases, soft tissue sarcoma, etc, irradiated with high dose fractions (ranging from 4-8 Gy) twice/wk. In these cases heat was delivered at the same temperature and for the same time as above, immediately after or 4 hr after radiation. All lesions responded well, and complete local control was obtained in about 2/3 of cases. An increased radiation reaction on normal tissue was observed in some instances. (no Refs)

56. USE OF CT IN THE PLACEMENT OF HEAT MONITORING THERMOCOUPLES FOR HYPERTHERMIA THERAPY.

Eftekhari F, Bernardino ME, Headley DL, Corry PM
(c/o Bernardino) Dept. Diagnostic Radiology, M. D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
J Comput Assist Tomogr; 5(6):933-936 1981

In 12 cancer patients undergoing hyperthermia therapy, computed tomography (CT) was used for placement of thermocouples within the tumoral tissue. Tumors were located in the thorax, abdomen, and pelvis. Computed tomography provided accurate angulation of the introduction angiocatheter as well as the ability to choose the shortest and safest path. The cross-sectional display was especially helpful in placing the heat monitoring thermocouple within the active part of the tumor rather than a necrotic portion. It is our opinion that CT is superior to fluoroscopy in this regard. (Author abstract) (9 Refs)

57. DIRECT TEMPERATURE MEASUREMENTS IN CARCINOMA OF THE PROSTATE IN PATIENTS TREATED WITH LOCALIZED DEEP MICROWAVE HYPERTHERMIA (MEETING ABSTRACT).

Yerushalmi A, Fishelovitz Y, Kushnir Y, Ben-Moshe G, Ariel E
Radiation Unit, Weizmann Institute of Science Rehovot, Rehovot 76100, Israel
Strahlentherapie; 157(9):624 1981

In our clinical hyperthermic treatment protocol we use 2.45-GHz microwaves (mw) as well as other heating methods for superficial solid tumors. We extended our clinical studies and we treat patients with carcinoma of the prostate. We present data on the build-up and maintenance of Localized Deep Microwave Hyperthermia (LDMWH) temperatures of 43-43.5 C. At present, with existing technology, the temperature of heated internal tumors cannot be measured noninvasively. Therefore, in order to assess intratumo r temperatures under our hyperthermic conditions, we use the opportunity to apply a treatment when a biopsy is performed on our patients. We applied 2.45

GHz LDMWH by means of coaxial probe inserted into the rectal cavity. To avoid overheating and damage to the rectal cavity, epithelium and mucosa we use a cooling coil wrapped on the applicator and connected to a circulating water cooling system. This cooling keeps the rectal mucosa at a temperature lower than 32 C while the tumor's temperature is 43-43.5 C. One thermocouple was placed in the rectal mucosa for monitoring the rectal mucosa temperature. A biopsy was performed under general anesthesia. The biopsy was performed through the perineum. After taking out the biopsy sample, the thermocouple wire was pushed through the lumen of the needle. The needle was removed after the junction had been positioned at the desired location in the tumor. Temperature measurements were taken and recorded at one min intervals. The results of the invasive temperature measurement confirmed that intratumor temperatures were 43-43.5 C under our condition of LDMWH. (no Refs)

58. HYPERTHERMIC PERFUSION WITH CYTOSTATIC DRUGS: AN ADJUVANT THERAPY IN SOFT TISSUE SARCOMA OF THE LIMBS.

Tonak J, Beck H
Chirurgische Universitatsklinik Erlangen-Nurnberg, Maximilianspiatz, D-8520 Erlangen, W. Germany
Langenbecks Arch Chir; 355:157-160 1981

Fifteen patients with prognostically unfavorable or recurrent soft tissue sarcomas of the limbs were treated with hyperthermic perfusion of melphalan and actinomycin-D. Ten patients were disease-free an av 30 mo after perfusion. Two patients had local recurrence and three died of pulmonary metastases 16-34 mo after perfusion. Further use of hyperthermic perfusion is recommended. (13 Refs) (In GER)

59. HYPERTHERMIC TREATMENT OF MELANOMA OF THE LIMBS: THE PRESENT STATE OF KNOWLEDGE (MEETING ABSTRACT).

Cavaliere R, Di Filippo D, Moricca G, Cavallari A, Aloe L, Varanese A, Piarulli L
Regina Elena Institute for Cancer Research, Rome, Italy
Strahlentherapie; 157(9):616 1981

Since 1965, hyperthermic perfusion with or without antiblastic drugs has been the choice treatment for melanoma of the extremities, in Stages IIIA, IIIB and IIIAB, that is, in the advanced phases of loco-regional spreading. Up to the present time 113 patients have been treated by hyperthermic perfusion and we may evaluate the results we have obtained. In patients with a Stage II, IIIA, IIIB and IIIAB, excluding the first and fourth stages, we obtained five yr survival rates of 56.5% and 42.3% with hyperthermic perfusion and hyperthermic antiblastic perfusion, respectively. A separate evaluation of the two different procedures shows that better results were obtained with hyperthermia alone but the difference is not statistically significant. A randomized study is currently in progress to further verify which of the two treatments gives better results. We had survival rate of 70%, over a five-yr period, in patients with in-transit metastases at Stage IIIA with treatment by hyperthermic perfusion. This high percentage is by far the best gained when compared to other forms of therapy. With regard to primary melanoma, we routinely perform hyperthermic antiblastic perfusion when the max thickness, according to Breslow, is of more than 1.8 mm. The same perfusion is also performed for locally recurrent melanoma with or without satellitosis. Hyperthermia without antiblastic drugs was excluded for these stages of the disease after we demonstrated that no differences exist between the two procedures, taking into account the 5-yr survival rates obtained. Furthermore, hyperthermic perfusion is more difficult and more costly than hyperthermic antiblastic perfusion. (no Refs)

60. EFFECT OF LOCALIZED HYPERTHERMIA ON THE 'IN VIVO' AND 'IN VITRO' IMMUNE RESPONSE OF PATIENTS WITH ADVANCED CANCER (MEETING ABSTRACT).

Salama AM, Goutner A, Brule JM, Cosset JM, Dutreix J
Institute Gustave-Roussy, Villejuif, France
Strahlentherapie; 157(9):622 1981

Twenty-three patients with advanced cancer were subjected to localized hyperthermia by short-wave capacitive diathermy (27 MHz) for two wk in the order of 3 sessions a wk. Each session lasts one hr at the temperature of about 42 C. This group of patients was submitted for both cell and humoral immune tests, which are done on two occasions, two days before and after the hyperthermia course. Cell-mediated immune response was studied using both in vivo skin tests (delayed-type hypersensitivity DTH) to seven recall antigens. A 70% glycerin soln, the antigen diluent, is provided as a negative control; and in vitro tests which include response to mitogens and spontaneous cell-mediated cytotoxicity reaction. Humoral immunity was evaluated using immunoglobulin dosages (IgG, IgM, IgA) and that of complement fractions C'3 and C'4. In addition, full blood count, sedimentation rate and dosage of Carcino-embryonic Antigen (CEA) were estimated before and after hyperthermia course. The results of this study indicated that there is no significant modification of the dosages of immunoglobulins, CEA, C'3 and C'4 and equally that of sedimentation rate. DTH reactions were augmented in 14/23 patients. The responsiveness of lymphocytes for mitogens was diminished after hyperthermia in most cases. Lymphocytosis variations could not be correlated with the response to treatment. Effective tumor response to hyperthermia seemed to be associated with an increase in both natural killer reactivity and delayed type hypersensitivity reactions. (no Refs)

PRE-CLINICAL STUDIES

61. GASTROINTESTINAL DECONTAMINATION OF DOGS TREATED WITH TOTAL BODY IRRADIATION AND BONE MARROW TRANSPLANTATION.

Vriesendorp HM, Heidt PJ, Zurcher C
Northwestern Univ. Cancer Center, 710 North Fairbanks Court, Chicago, IL, 60611
Exp Hematol; 9(9):904-916 1981

Procedures for total and selective gastrointestinal decontamination of dogs are described. The selective procedure removed only Gram negative aerobic bacteria, yeast and fungi. Dogs receiving total decontamination were less susceptible to the GI syndrome following total body irradiation (TBI) than dogs receiving conventional care. After TBI and allogeneic bone marrow transplantation, serum albumin levels decreased in conventional animals, but remained normal in totally or selectively decontaminated animals. Exogenous infections occurred frequently in both irradiated, and totally decontaminated animals, but were absent in selectively decontaminated animals. Endogenous infections after total body irradiation were prevented only by total decontamination. Endogenous infections occurred in selectively decontaminated animals, but with

milder clinical symptoms than in conventional animals. Appearance of donor type WBC and serum gamma globulin was slower in decontaminated animals than in conventionally treated controls. Acute graft versus host disease caused by a limited number of lymphocytes of a DLA identical littermate donor were prevented by selective gastrointestinal decontamination. Complications due to late immune reconstitution obscured the effect of decontamination of delayed graft versus host disease. (Author abstract) (31 Refs)

62. DOES LOCAL X-IRRADIATION OF A TUMOR INCREASE THE INCIDENCE OF METASTASES?

Baker D, Elkon D, Lim ML, Constable W, Wanebo H
Div. Radiation Oncology, Dept. Radiology, Univ. Virginia Medical Center, Charlottesville, VA, 22908
Cancer; 48(11):2394-2398 1981

KHT sarcomas were implanted into the right rear legs of CeH mice. Animals receiving no treatment died at 32 days with a 67% incidence of metastatic tumors. A dose of 6,000 rads in 10 fractions over 12 days, starting 10 days after implant, delivered to the primary tumor (with the remainder of the body shielded) produced 55% local tumor control. However, 83% of the mice with local tumor control, subsequently developed metastatic lesions. Amputation of the tumor-bearing leg either prior to the start of radiation treatment, at the end of treatment or at intervals during treatment or sham treatment, indicated that (1) metastases occurred predominantly during the initial three radiation fractions and (2) the increased incidence of metastases following irradiation was a result of the manipulations associated with the irradiation and not the irradiation per se. Irradiation did not change the distribution of organ sites involved with metastatic tumors compared to untreated or sham-treated tumors. (Author abstract) (20 Refs)

63. HIGH-DOSE TOTAL-BODY IRRADIATION AND AUTOLOGOUS MARROW RECONSTITUTION IN DOGS: D OSE-RATE-RELATED ACUTE TOXICITY AND FRACTIONATION-DEPENDENT LONG-TERM SURVIVAL.

Deeg HJ, Storb R, Weiden PL, Schumacher D, Shulman H, Graham T, Thomas ED
Dept. Medicine, Univ. Washington Sch. Medicine, Seattle, WA, 98104
Radiat Res; 88(2):385-391 1981

Acute and delayed non-marrow toxicities of high single-dose and fractionated total-body irradiation (TBI) delivered at exposure rates of 0.05 and 0.1 Gray (Gy)/min were compared in Beagle dogs given autologous marrow transplants in order to avoid death from marrow toxicity. These exposure rates are in the range at which TBI is being delivered from opposing 60Co sources to human marrow transplant recipients. At 0.05 Gy/min all 10 dogs given 16 or 18 Gy in fractionated or single-dose regimens died acutely within 7 days of completion of TBI from intestinal toxicity. Among 10 dogs given 14 Gy at 0.05 Gy/min only 2 dogs given fractionated TBI died acutely on days 6 and 7 from intestinal toxicity and scpticemia. The remaining 8 dogs survived beyond 1 mo. At an exposure rate of 0.1 Gy/min all 7 dogs given 14 Gy and 8/10 dogs given 12 Gy in fractionated or single dose regimens died acutely within 10 days from intestinal toxicity and septicemia. Two dogs given 12 Gy TBI survived the acute radiation toxicity. Ten dogs were given total doses of 10 Gy. Three of 5 dogs given single-dose TBI died; two survived beyond 1 mo. Two of 5 dogs given fractionated TBI died and 3 dogs survived beyond 1 mo. Long-term results showed striking differences between dogs given fractionated or nonfractionated TBI. Only dogs given fractionated TBI became healthly long-term survivors. (21 Refs)

64. PIPERAZINEDIONE (NSC 135758) AND TOTAL BODY IRRADIATION AS AN ABLATIVE BONE MARROW TRANSPLANTATION REGIMEN IN MICE.

Zander AR, Huynh L, Spitzer G, Verma DS, Dicke KA
Dept. Developmental Therapeutics, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX, 77030
Exp Hematol; 9(9):945-949 1981

An antitumor antibiotic with activity against leukemia, Piperazinedione, has been incorporated into a regimen for clinical bone marrow transplantations. Studies were conducted to evaluate the effect of piperazinedione on hemopoietic stem cells and the recovery of hemopoiesis after syngeneic transplantation. The effect of piperazinedione on hemopoietic stem cells is short in duration (nadir day 1). Myelosuppression does not appear to be its limiting toxicity. since mice could not be rescued by syngeneic bone marrow at increased doses of piperazinedione. Piperazinedione given prior to total body irradiation has an enhancing effect on colony-forming unit culture (CFUc) and colony-forming unit spleen (CFUs) recovery from day 7 to day 90 post transplantation when compared with total body irradiation alone. (Author abstrac t) (15 Refs)

65. TUMOR RESPONSES AFTER SIMULTANEOUS OR SEQUENTIAL HYPERTHERMIA AND RADIATION IN MICE (MEETING ABSTRACT).

Arcangeli G, Cividalli A, Lovisolo G, Mauro F, Pardini MC
Istituto Medico e di Ricerca Scientifica, 00191 Rome, Italy
Strahlentherapie; 157(9):614 1981

For this study, a homogeneous heating could be preferentially induced in tumor mice by means of one or more interstitial applicators operating at a frequency of 500 MHz. Following such technique, several combined treatment schedules have been tested on a radioresistant fibrosarcoma of spontaneous origin, transplanted in the mouse thigh, employing a temperature of 45 C for 45 min. In small tumors, similar responses (that is, a tumor reduction below palpable size) were observed after both simultaneous and sequential schedules as well as after 3 fractions of heat alone, while only a delay of tumor growth was obtained after radiation alone at different total and fractional doses. In large tumors, hyperthermia alone induced only a slight growth delay, while with radiation alone responses similar to those obtained in small tumors were observed. Even in these large tumors, the delays induced by both simultaneous and sequential treatment appeared to be similar, though markedly shorter in respect to those obtained in small tumors. These results suggest that tumor response to thermoradiotherapy could be due to an essentially additive effect, and that, at temperatures of 45 C or above, the antitumoral effect could be more strictly related to the cytodestructive rather than radiosensitizing effect of heat. (no Refs)

66. INTERMITTENT HYPERTHERMIA IN FRACTIONATED THERMORADIOTHERAPY (MEETING ABSTRACT).

Dietzel F, Lichart G, Kovacs G, Musch H
Radiologisches Institut, Bayreuth, W. Germany
Strahlentherapie; 157(9):616 1981

Neck tumors (solid Ehrlich-Carcinoma of 1 ml size) in female NMRI-mice were locally treated with 8 x 5 Gray (Gy)

x-ray irradiations alone or in combination with an immediately following 3-min local 2.4-GHz microwave hyperthermia up to 42 C within the tumor. The single fractions were applied 2 x per wk, the overall treatment time was 4 wk. Heat was given either with each x-ray fraction or only one time per wk (intermittent hyperthermia). In each experimental group there were 50-100 animals. Endpoints were tumor growth, increase of survival time of 50 percent (ST50) and local tumor control on day 100 with respect to radiation reaction of skin, spinal cord and lungs. To evaluate a therapeutic gain, we compared the effect of thermoradiotherapy with the effect of a 1.6 x higher fractionated x-ray treatment, given with the same fractionation scheme. Tumor growth was retarded by 8 fractions of combined 5-Gy x-ray/hyperthermia treatment significantly more than by 8x5 Gy x-ray only. The survival time for 50 per cent (ST50) was signific antly increased by the combined therapy. Local tumor control on day 100 was 13.6 percent, when heat was given with each x-ray fraction. With intermittent hyperthermia, ie one hyperthermia treatment per wk, the survival rate on day 100 was 100 percent. Compared to the 1.6 x higher fractionated x-irradiation (8 Gy per fraction), which caused severe local skin reaction (extreme desquamation, ulceration) and radiogenic myelopathia without producing cures on day 100, the combined modality resulted in more than 13 percent local tumor control without defect of surrounding tissue. Thus, the therapeutic gain factor is at least 1.6. In experiments with intermittent hyperthermia it could be demonstrated, that it is not necessary to heat tumor with each fraction. (no Refs)

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BREAST NEOPLASMS

1. PRIMARY RADIATION THERAPY IN THE TREATMENT OF EARLY BREAST CANCER.

Hellman S, Harris JR, Levine MB
Dept. Radiation Therapy, Harvard Medical Sch., Boston, MA, 02115
Isr J Med Sci; 17(9/10):922-927 1981

The results of the treatment of 184 breast cancers in 176 patients are reported. Local recurrence occurred in 5% of Stage I patients and 7% of Stage II patients. Local control was sig-

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nificantly greater in those who received an iridium implant. By combining these data with those for Stage III br east cancer patients, local control could be shown to occur with a greater likelihood and at a lower dose when gross tumor excision preceded the radiation. (Author abstract) (28 Refs)

2. TREATMENT OF LOCALLY ADVANCED BREAST CARCINOMA WITH HIGH-DOSE EXTERNAL BEAM SUPERVOLTAGE RADIOTHERAPY.

Brufman G, Weshler Z, Prosnitz LR, Fuks Z
Dept. Radiation and Clinical Oncology, Hadassah Univ. Hosp., POB 12000, 91120 Jerusalem, Israel
Isr J Med Sci; 17(9/10):940-945 1981

Between 1960 and 1978, 87 patients with locally advanced T3-4N0-3M0 carcinoma of the breast were treated with 5,000 to 8,000 rad of external beam supervoltage radiotherapy. Initial clinical eradication of the tumor was observed in 76 of 87 cases (87%), but the actuarial probability of local control at 5 yr was only 53%. Furthermore, the actuarial probability of disease-free survival was 25% at 5 yr and 13% at 10 yr. Most of the patients eventually succumbed to metastatic breast carcinoma and the actuarial survival at 5 yr was 43% and at 10 yr, 16%. The addition of adjuvant low-dose chemotherapy, given to 13 patients, did not affect the rates of local control, survival or disease-free survival. The most common long-term complication was extensive and deforming radiation-induced fibrosis of the treated breast. The actuarial probability of 10-yr survival without a local recurrence and without severe fibrosis of the treated breast was only 17.5%. The role of adjuvant high-dose chemotherapy in the treatment of locally advanced breast carcinoma and the possible use of improved radiotherapy techniques to achieve a more effective long-term local control and a more desirable cosmetic end result are discussed. (Author abstract) (26 Refs)

3. VALENCY OF POSTOPERATIVE RADIOTHERAPY IN THE TREATMENT OF MAMMARY CARCINOMA.

Frommhold H, Vatter J, Thurn P
Universitatsklinik fur Radiologie, A-6020 Innsbruck, Austria
Strahlentherapie; 157(3):145-152 1981

Five hundred eighty-four cases of histologically proved mammary carcinoma have been analyzed with regard to 5-and 10-yr survival rates, frequency of loco-regional recurrences and formation of remote metastases. A comparison was made between patients showing comparable stages who were submitted only to surgical treatment and who were operated and irradiated after the operation. As to the stage Steinthal I, there were 134 patients only submitted to radical operation and 129 patients submitted to radical operation and subsequent irradiation. Fifty-two patients showing the stage Steinthal II were only submited to radical operation and 126 patients with the same stage were submitted to radical operation and subsequent irradiation. It is not possible to statistically demonstrate that radiotherapy deteriorates the 5-yr and 10-yr survival time. A comparison of survival rates of only operated and subsequently irradiated patien ts without recurrences shows significantly a positive influence of the postoperative radiotherapy upon the survival times of patients with the Stages Steinthal I as well as Steinthal II. The frequency of loco-regional recurrences is analyzed descriptively. A reduction of loco-regional recurrences by radiotherapy is only relevant for the stage Steinthal II. So, during an observation time of 6 to 7 yr the rate of recurrences of the breast wall was reduced from 37.8% to 17.6%, and during a comparable period of 4 yr the rate of lymph node recurrences was reduced from 27.7% to 13.6%. The rate of remote metastases is neither significantly increased nor reduced by postoperative radiotherapy. (Author abstract) (46 Refs) (In GER)

4. RADIATION THERAPY WITH OR WITHOUT PRIMARY LIMITED SURGERY FOR OPERABLE BREAST CANCER: A 20-YEAR EXPERIENCE AT THE MARSEILLES CANCER INSTITUTE.

Amalric R, Santamaria F, Robert F, Seigle J, Altschuler C, Kurtz JM, Spitalier JM, Brandone H, Ayme Y, Pollet JF, Burmeister R, Abed R
(c/o Spitalier) Dept. Radiotherapy, Marseilles Cancer Inst., BP 156 F13273, Cedex 02 Marseilles, France
Cancer; 49(1):30-34 1982

Since 1960 more than 3,000 consecutive patients with operable infiltrating breast carcinoma were treated by radiation therapy with or without primary limited surgery, which usually consisted of local excision. For tumors smaller than or equal to 5 cm the 10-yr crude survival rate is 77% for patients without palpable axillary nodes (T1-2N0) and 63% for patients having axillary adenopathy (T1-2N1). For operable tumors exceeding 5 cm in diameter (T3N0-1) the 10-yr crude survival is 34%. Thirty-five percent of the patients alive free of disease at 10 yr required a secondary operation for presumed local or regional tumor persistence or recurrence, although no residual disease was found in 24% of the operative specimens. Local-regional recurrence had no adverse effect on 10-yr survival. This conservative approach offers most women with operable breast cancer and excellent chance at breast preservation with the same chance for 10-yr survival as with radical mastectomy. (Author abstract) (36 Refs)

5. CONSERVATIVE TREATMENT IN BREAST CANCER (T1-T2): THE COMBINATION OF LUMPECTOMY, PER-OPERATIVE INTERSTITIAL RADIOTHERAPY AND EXTERNAL RADIATION THERAPY (120 CASES) (MEETING ABSTRACT).

Maylin C, Mignot L, Viandier A, Baillet F, Clot P, Gorins A, Marty M
Department of Radiation Therapy, Hopital Necker, Paris, France
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

It is now established that conservative therapy in T1-T2 breast cancer allows for similar survival than radical mastectomy. We have designed a conservation sequence in such breast cancers, the aim of this study being to extend indications for lumpectomy to T2 cancers. During the surgical stage, a lumpectomy and axillary nodal exploration are performed, simultaneously pre-operative implant of plastic tubes is done and Ir192 during the following 48 hr gives to tumor site 20 Gray (Gy). External radiation therapy with Co60 is performed within 15 days of surgery; dose to breast and axillary is 45 Gy in 5 wk. Such local treatment does not preclude further adjuvant therapy as indicated by nodal involvement and study of hormonal receptors. Since 1979, October, 120 women (10 T1, 110 T2) have been treated following this protocol. Preliminary results are as follows: 1) Morbidity of such schedule has been low as we have seen 2 local resolutive infections, 1 cutaneous resolutive necrosis. Median duration of hospitalization has been 5 days. 2) In 80% of cases cosmetic results were judged good or excellent. 3) No local recurrence has been observed to date. Such approach conservative treatment should be considered as a safe alternative to radical mastectomy especially in T2 breast cancer. (no Refs)

6. MAMMOGRAPHIC EVALUATION OF THE CHANGES IN THE BREAST AFTER RADIOTHERAPY FOR BREAST CARCINOMA. PART I: STUDY OF BREAST TUMOR REGRESSION AFTER RADIOTHERAPY.

Moczko W, Luczak I, Ramlau C, Moczko J, Simon E
Instytut Radiologii, AM w Poznaniu, ul. Szkolna 8/12, 61-833 Poznan, Poland
Pol Przegl Radiol; 45(4):193-197 1981

Twenty-eight 36-72-yr-old women with inoperable breast cancer were submitted to radiotherapy, and quantitative changes in the tumor vol as a result of the treatment were evaluated by mammography. Mammography was performed before, in the middle, immediately, as well as 2 and 4 mo after the radiotherapy. Control examinations were then performed at 4-mo intervals. Significant reduction of the tumor vol was found after radiotherapy in all patients. Three phases were discerned in the course of the tumor regression. The first phase was characterized by rapid vol reduction during treatment and, in half of the patients, for up to 8 wk after completion of the radiotherapy. The second phase was that of slowly progressing decrease in the tumor vol for up to 8 mo from the beginning of the treatment. The third, late regression phase 9-22 mo after radiotherapy, was characterized by nonuniform changes in tumor size with persistence of residual tumor or secondary enlargement, indicative of stabilization of the process or of local recurrence. There was a discrepancy between the clinical and mammographic evaluation of the tumor regression after radiotherapy. There was no correlation between the mode and rate of tumor regression and the histological type. (5 Refs) (In POL)

CENTRAL NERVOUS SYSTEM NEOPLASMS

7. MALIGNANT BRAIN GLIOMA: THE POSSIBLE ROLE OF PREOPERATIVE RADIOTHERAPY (MEETING ABSTRACT).

Muller H, Roggendorf W, Brock M
Neurosurgery, Department, Klinikum Steglitz Free University, Berlin-West, W. Germany
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Surgical treatment of malignant supratentorial gliomas remains problematic. One of the difficulties is caused by bad demarcation of the tumor mass from brain tissue. Neuropathological findings in non-operated patients treated with irradiation and chemotherapy showed an unusually good demarcation between tumor and surrounding brain tissue as well as an increased tumor consistence. The same was seen at surgery in a patient with a glioblastoma of the temporal lobe, pre-treated with 12 Gy betatron radiotherapy. In postoperative serial computed tomographic scans there has been no evidence of any tumor recurrence for several mo. Our findings encourage us to direct more importance to such a modified therapy regimen. (no Refs)

8. METASTATIC CNS DISEASE IN SMALL CELL CARCINOMA OF THE BRONCHUS: THE ROLE OF RADIOTHERAPY AND CHEMOTHERAPY.

Whitehouse JM, Williams CJ
CRC and Wessex Regional Medical Oncology Unit, Southampton, England
Recent Results Cancer Res; 80:207-213 1982

Treatment of CNS metastases (CNSM) of small cell carcinoma of the bronchus (SCBC) is reviewed. CNSM are found in approx 10% of patients with SCBC at presentation and develop in approx 40% during treatment. About 10% of SCBC patients have asymptomatic CNSM. Whole brain irradiation has not improved survival significantly in patients with brain relapse, because most of these patients have extensive metastases at other sites. A nonrandom study indicated that prophylactic brain irradiation (PBI) reduces brain metastases at 12 and 24 mo to 11%, compared with 28% at 12 mo and 58% at 24 mo in patients not receiving PBI. In another study brain metastases were reduced from 20% to 2% by PBI. Overall survival was not improved by PBI, but distress due to neurological symptoms was reduced. One study reported a treatment related syndrome of poor attention span, recent memory loss, action tremor, slurred speech, and myoclonus that appeared 2-4 mo after initiation of treatment and resolved spontaneously within 4 mo. Chemotherapy with agents that cross the blood-brain barrier, including nitrosourea derivatives, procarbazine, and high-dose or intrathecal methotrexate have not been effective against CNSM, although combination drug therapy has prolonged survival in 60-80% of cases. Effective control of SCBC will require control of disease outside the CNS. (40 Refs)

9. PHOTORADIATION THERAPY IN THE TREATMENT OF MALIGNANT BRAIN TUMORS: A PHASE I (FEASIBILITY) STUDY.

Laws ER, Cortese DA, Kinsey JH, Eagan RT, Anderson RE, Chou SN
Dept. Neurologic Surgery, Mayo Medical Sch., Mayo Clinic, Rochester, MN
Neurosurgery; 9(6):672-678 1981

A system for the photoradiation of hematoporphyrin derivative (HPD) in brain tissue is described which was used in a Phase I study in five patients with incurable, malignant, parenchymal neoplasms which did not respond to conventional therapy. After rapid iv infusion of HPD (5 mg/kg), the patients were protected from sunlight and bright, artificial light for at least 2 wk. After 48-74 hr, a sterile, single quartz fiber probe was implanted 2 mm into the tumor. The fiberoptic probe was coupled to an argon-pumped continuous wave dye laser. The goal of therapy was to deliver 300 milliWatts of red light (wavelength 630 nanometer), for 45 min. Needle biopsies of the lesions were obtained at the beginning and end of each procedure and each sample was evaluated visually for HPD fluorescence under light at 405 nanometer. No significant adverse reactions have occurred, and further development and research are planned. (28 Refs)

10. INTERSTITIAL IRRADIATION OF BRAIN TUMORS: A REVIEW.

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Neurosurgery; 9(6):741-750 1981

The general history of clinical interstitial irradiation (IR) for neoplasms is reviewed and the history and current status of IR

for brain tumors is discussed. IR has two advantages over teletherapy: radiation delivered at low dose rates and intratumoral placement of sources. The differential cell killing effectiveness is increased by the exposure to low dose rate, compared to high dose rate, irradiation. The computed tomography scanner has revolutionized the use of IR for brain tumors. The fact that trials of IR for brain tumors have been conducted at many centers where it is no long employed is an indication that such tumors are deeply situated. It is stressed that the theoretical advantages of the low dose rate radiation and the intratumoral placement of the source warrant continued study and improvement in this modality. In the authors' institution, primary and recurrent malignant brain tumors have been implanted with removable or permanent 192Ir, 198Au, or 125I sources since 1977. Doses to the periphery of the tumors ranged from 3,000 to 20,000 rads. Preliminary results of the study have been encouraging. (175 Refs)

DIGESTIVE NEOPLASMS

11. ERADICATION AND PALLIATION OF SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS WITH CHEMOTHERAPY, RADIOTHERAPY, AND SURGICAL THERAPY.

Steiger Z, Franklin R, Wilson RF, Leichman L, Seydel H, Loh JJ, Vaishamapayan G, Knechtges T, Asfaw I, Dindogru A, Rosenberg JC, Buroker T, Torres A, Hoschner D, Miller P, Pietruk T, Vaitkevicius V
Veterans Admin. Hosp., Allen Park, MI, 48101
J Thorac Cardiovasc Surg; 82(5):713-719 1981

Between April, 1977, and March, 1981, 86 unselected patients with proved squamou s cell carcinoma of the esophagus were treated with a combination of chemotherapy and radiotherapy followed by operation whenever feasible. The preoperative chemotherapeutic agents used initially were 5-fluorouracil, and mitomycin C. After December, 1979, cis-platinum was used instead of mitomycin C. Radiotherapy (3,000 rads) of the tumor was begun at the same time as the chemotherapy. An esophagectomy was performed on suitable candidates 3 tc 4 wk after the chemotherapy and radiotherapy were compieted. the mucosal lesion disappeared in 69 of the 86 patients, and dysphagia was relieved at least temporarily in 57 of 62 patients. Recurrent dysphagia resulting from fibrosis at the tumor site caused a secondary stenosis in 11 patients. Excellem palliation was obtained in five patients with bronchoesophageal fistulas who had an initial substernal gastric bypass followed by chemotherapy and radiotherapy. Of the 48 patients who had an esophagectomy, 15 (31%) had no tumor in the resected specimen. Eleven of these 15 patients are still alive with no evidence of disease. All patients with a lesion less than 5.0 cm in length had complete regression of the tumor. We believe that this combination of chemotherapy, radiotherapy, and surgical therapy provides excellent palliation, increases resectability, and has a potential for cure. (Author abstract) (14 Refs)

12. SURGICAL TREATMENT OF RECURRENT ESOPHAGEAL CARCINOMA AFTER CURATIVE RADIOTHERAPY.

Zhang D, Huang G, Zhu Z
Dept. of Surgery, Ritan Hosp., Chinese Acad. of Medical Sciences, Beijing, People's Republic of China
Zhonghua Waike Zazhi; 19(5):268-270 1981

Clinical experience is described for 54 cases (45 males, 9 females; aged 34-61 yr) treated between 1962 and 1979. In 40 cases (74.1%) the period between radiotherapy and surgery was less than 1 yr, in 7 cases (13%) it was over 5 yr, and in 1 case it was 9.5 yr. The overall resectability rate in this series was 75.9% and the surgical mortality was 21.9%. There were 41 instances of postoperative complications among which the most common were pneumonia (11 cases, 26.8%), empyema, and anastomotic fistula (each 7 cases, 17.1%). The 5-yr postoperative survival rate was 21.4% (or 26.1% if operative mortality was excluded). When previous radiotherapy results were also considered, the 5-yr survival became 30.4%, indicating the advantage of combining preoperative radiotherapy with surgery. Major factors affecting prognosis were nature of resection, reaction of tumor to radiation and lymph node metastasis, with the last being the most important. It was concluded that surgical treatment can be successfully used in recurrent esophageal carcinoma after curative radiotherapy as long as patient is in generally good condition and without distant metastasis. (2 Refs) (In CHI)

13. STUDY OF LONG-TERM SURVIVAL OF PATIENTS WITH ESOPHAGEAL CARCINOMA WHO WERE TREAT ED WITH RADIOTHERAPY.

Miyaji C, Ogawa Y, Tsuboi Y, Oshitani T, Okuno T, Takashima H, Imanaka K, Imajo Y, Kimura S, Yasutake K
Dept. Radiology, Kobe Univ. Sch. Medicine, Kobe, Japan
Gan No Rinsho; 27(14):1721-1728 1981

Six patients (3 men, 3 women; 59-86 yr old) with esophageal cancer who survived greater than 5 yr after radiotherapy were studied. Tumors were 3-7 cm long, histologically classified squamous carcinoma in four cases and unknown in two, and roentgenologically classified as spiral- (3), serrated- (1) tumorous- (1), and funnel-types (1). Three cases were treated with 60Co fixed radiotherapy (4,500-7,000 rads total), and three were treated with fixed linac x-ray (6,000-14,210 rads total) radiotherapy. Radiation fields were 31.5-80 square cm large. Tumors disappeared completely in 4/6 patients after radiotherapy. Of these four patients, two had local recurrence (4 yr 9 mo and 7 yr 5 mo, respectively, after initial diagnosis). One patient was alive at yr 5, and the other five patients died 5 yr 1 mo to 8 yr after diagnosis. Optimum dosage of radiation was thought to be 6,000-7,000 rads delivered over 6-7 wk. In the four patients whose tumors disappeared after radiotherapy, the nominal standard dose (NSD) to the normal tissue was 1,548-1,968 rad-equivalent-therapeutic (ret) and to the tumor tissue was 2,240-2,980 ret. Bleomycin combined with the radiotherapy had good effects in one of the patients. Observation during the course of the therapy by means of biopsy and endoscopy was thought to be as important for improving the therapeutic results as early diagnosis. Use of elemental diet therapy was also thought to have reduced the need to do gastrostomy in such patients. (20 Refs) (In JPN)

14. ADJUVANT THERAPY FOR LARGE BOWEL CANCER; UPDATE OF VETERANS ADMINISTRATION SURGICAL ONCOLOGY GROUP TRIALS.

Higgins GA, Donaldson RC, Humphrey EW, Rogers LS, Shields TW
Veterans Admin. Medical Center, 50 Irving St., N.W., Washington, D.C., 20422
Surg Clin North Am; 61(6):1311-1320 1981

Eight prospective randomized clinical trials are reviewed and the results reported. Treatment modalities included preoperative radiotherapy (PRT), 5-fluorouracil (FU), prolonged intermittent therapy (PIT), methyl-1-(2-chloroethyl)-3-cyclohexyl-1-nitrosourea (M) trials, and chemo-immunotherapy (CI).

In PRT Trial-1, all patients with lesions within reach of the sigmoidoscope were randomized for surgery alone or for PRT at a dosage of 2000 rads over a 2-wk period, with surgery carried out after completion of radiotherapy. Data indicated that addition of PRT affords substantial therapeutic benefit. In PRT Trial-2, only those patients having histologically proven rectal carcinoma at a level requiring abdominoperineal resection were included. A dosage of 175 rad for each of 18 treatments over a 24-day period was administe red. Although follow-up data are not complete, evidence suggests benefit from the treatment. PIT and FU trials prolonged the survival rate of patients. Combined M and FU trials have not yet given any evidence of therapeutic benefit. CI has been tested only in a small trial for patients with proven palliative resection. In addition to M and FU, patients received BCG methanol extract residue at a dosage of 2 mg divided into five id injections. Survival decreased, possibly due to tumor enhancement by the immunostimulant. (6 Refs)

GENITOURINARY NEOPLASMS

15. CARCINOMA OF THE PROSTATE: THE TREATMENT OF BONE METASTASES BY RADIOPHOSPHORUS.

Glaser MG, Howard N, Waterfall N
Dept. Radiotherapy and Surgery, Charing Cross Hosp., London, England
Clin Radiol; 32(6):695-697 1981

Osseous deposits secondary to advanced carcinoma of the prostate are a common feature of the disease. These deposits are most often seen in the lumbar spine and pelvis and cause severe and intractable pain, often requiring large quantities of strong analgesia for alleviation of pain. Relief of pain can be achieved by external irradiation of these deposits, but this relief may not be permanent and the disease may be so widespread that it is impracticable to treat all the deposits by irradiation. Deposits from carcinoma of the prostate are usually multiple and all may cause pain at the same time. A method of delivering the radiation to all the deposits at the same time has been sought. Previous studies have shown that radioactive phosphorus (P32) can be used to obtain this localization of radioactivity at sites of osseous activity. In this study 24 patients with bone metastases from carcinoma of the prostate were treated with radiophosphorus and methyl testosterone, or radiophosphorus with parathormone and calcium. An overall response rate of 58% shows this to be an effective palliative treatment. The results suggest there is a greater response when P32 is used in conjunction with parathormone and calcium, than with methyl testosterone. (Author abstract) (5 Refs)

16. HYPERTHERMIC THERAPY OF BLADDER CANCER. III. CLINICAL STUDIES.

Kubota Y
Dept. Urology, Yokohama City Univ. Sch. Medicine, Yokohama, Japan
Nippon Hinyokika Gakkai Zasshi; 72(6):742-751 1981

Thirty-four patients with transitional cell carcinoma of the bladder were treated with either hyperthermia alone (HT; 6 cases), HT + bleomycin (BLM; 4), HT + radiation (RA; 9), or HT + RA + BLM. HT consisted of 10-12x 1-hr irrigations of the bladder with saline delivered through a 3-way catheter; during HT, the temperature in the bladder was maintained at 42-43 C. BLM was added to the saline soln with a final concentration of 30 mg/liter. 60Co linac RA was administered in doses of 150-200 rads (total 3,500-4,000 rads), and the HT was performed immediately after. Clear shrinkage or disappearance of the tumors were observed in 2/6 HT patients, 1/4 HTBLM patient 5/9 HTRA patients, and 12/15 HTRABLM patients. Bladder irritation and urethral pain were the primary side effects of the HT, and bladder irritation was induced most with the HTRABLM therapy. Immunosupression of lymphocytic blastogenesis was observed in the patients treated with HTRA and HTRABLM but the immunosuppression was no different than that observed with RA alone. Results indicated that HT is clinically applicable to treatment of bladder cancer. (30 Refs) (In JPN)

GYNECOLOGIC NEOPLASMS

17. A PHASE I-II TRIAL OF ABDOMINAL IRRADIATION (RT) FOLLOWING SURGERY AND CHEMOTHERAPY (CT) FOR OVARIAN CANCER. (MEETING ABSTRACT).

Greiner R, Goldhirsch A, Garavaglia G, Jeanneret M, Dolf P, Brunner K, Veraguth P
Department of Radiotherapy, Ludwig Inst for Cancer Research, Bern, Switzerland
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

A 'moving-strip' technique of abdominal RT (Co-60, prone position, SSD 65 cm, no liver shielding, midline dose 220 rads) was applied to 17 patients (pts), median age of 49 yr (14-61). Six pts with no primary CT initially received RT to the pelvis, median dose 2800 rads (2250-4760). Eleven pts had had CT and second look operations prior to RT and 7 of them had 'moving-strip' RT alone. Median duration of follow-up after start of RT is 27+ wk (1+66+). Median duration of RT was 91 days (65-178). Thrombocytopenia (Tcp) was the RT-limiting toxicity and required treatment delay in 5 pts. Median thrombocyte nadir was 43,000/mm3 (5,000-133,000) for pts with prior CT and 87,000/mm3 (45,000-155,000) for pts without prior CT. Median WBC nadir was 2200/mm3 (900-3100). Five pts experienced moderate to severe diarrhea during RT to the pelvis but none during 'moving-strip'. Eighty % of the pts had moderate to severe fatigue and appetite loss but only 2 lost greater than 5% of body wt. Eight pts (only 1 with symptoms) developed RT-induced basal pneumonia which appeared after a median period of 14 wk (11-20) following the start of RT to the diaphragmatic region. Radiological signs regressed within 1 mo. Only 2 pts had a greater than 2-fold increase of SGOT and alkaline phosphatase while a greater than 3-fold gamma glutamyl transpeptidase elevation was seen in 5 pts. No impairment of renal function was seen (7 pts had been treated with cis-platinum). No heart damage was observed. We conclude that for ovarian cancer a 'moving-strip' technique can be used with fair tolerance following CT. (no Refs)

18. PRELIMINARY REPORT OF THE M.D. ANDERSON HOSPITAL RANDOMIZED TRIAL OF NEUTRON AND PHOTON IRRADIATION FOR LOCALLY ADVANCED CARCINOMA OF THE UTERINE CERVIX.

Morales P, Hussey DH, Maor MH, Hamberger AD, Fletcher GH, Wharton JT
(c/o Hussey) Div. Radiotherapy, Univ. Texas System Cancer Center, M.D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
Int J Radiat Oncol Biol Phys; 7(11):1533-1540 1981

Between February 1977 and August 1979, 75 patients with locally advanced carcinoma of the uterine cervix were randomized to receive mixed beam or photon irradiation. All patients were evaluated in the fifth wk for completion of treatment with intracavitary irradiation or an external beam boost using randomized modality. Local tumor control, complications, and patient survival were reviewed. There were 43 patients in the mixed beam group (combination of 50-mega electron volt (MeV) neutrons and 25-MeV photons +- intracavitary radium), and 32 in the photon group (25-MeV photons +- intracavitary radium). Seventy-one patients had previously untreated squamous carcinoma of the cervix, one had adenocarcinoma of the cervix, and three had squamous carcinoma recurrent following radical hysterectomy. Approx one-fourth of the patients in each group had clinical evidence of pelvic lymph node metastasis. External beam treatments were delivered 5x/wk using 200-rad fractions. Mixed beam treatments were given 3x/wk with photons and 2x/wk with neutrons (65 rad, equivalent to 200 rad with photons). Two portal arrangements were used for total pelvis irradiation with photons: a two-field technique and a four-field box technique. There was no difference between the mixed beam and photon groups with respect to local control, frequency of complications, and patient survival. Results achieved with photons were superior to those achieved with mixed beam irradiation for Stage IIIA tumors. Major complications occurred in four patients of the mixed beam group and two of the photon group. Better results were obtained in patients who completed treatment with intracavitary radium. The local control rate with mixed beam irradiation plus intracavitary radium was 81% as compared with 65% for the photon plus intracavitary radium group, although this difference was not statistically significant. (7 Refs)

19. RADIOTHERAPY AND SURGERY IN THE MANAGEMENT OF CARCINOMA OF THE CERVIX, STAGES 1B AND 2A (MEETING ABSTRACT).

Browde S, Nora G, De Moor BS, Rabin BS, Koller A
Department of Therapeutic Radiology and Gynecology, University of the Witwatersrand, Johannesburg, South Africa
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

In a prospective study at the University of the Witwatersrand Medical School, 92 patients with either Stages 1b or 2a carcinoma of the cervix were treated by two protocols. In 1975 in the first protocol patients were treated with pre-op intra-cavitary Cs-137 followed by a Wertheims hysterectomy, with or without post-op Co-60 teletherapy depending on the pathological findings. Because of a high complication rate, in 1977 the second protocol was introduced. A staging laparotomy was performed, and depending on findings one of three approaches was adopted-radical surgery, radical radiotherapy or a combination of the two modalities. It was found that patients were clinically understaged in 42% of all cases. The high complication rate in the first group was not due to the pre-op intra-cavitary Cs-137 as originally was thought, as an equally high incidence was found in the surgery only arm of the second protocol study. In this second study, the survival rate in those patients receiving radical radiotherapy (when positive nodes were found at staging laparotomy), was equal to those who had radical surgery, in spite of more advanced disease being treated. When a combination of the modalities was used (when the pathological specimen was positive after surgery) the survival rate proved to be markedly decreased. Again, the survival rate was decreased in those patient with Stage 2a, and surgery is now no longer considered for patients with this stage of the disease. (no Refs)

20. INVASIVE SQUAMOUS CELL CARCINOMA OF THE UTERINE CERVIX. III. A MALIGNANCY GRADING SYSTEM FOR INDICATION OF PROGNOSIS AFTER RADIATION THERAPY.

Stendahl U, Eklund G, Willen H, Willen R
Dept. Oncology, Div. Gynecologic Oncology, Univ. Hosp., S-750 14 Uppsala, Sweden
Acta Radiol Oncol Radiat Phys Biol; 20(4):231-243 1981

The predictive value of a malignancy grading system embodied by eight histopathologic parameters and of staging, age, yr of admission and the different treatment modalities were compared in relation to 5-and 8-yr survival. The material consisted of 196 patients in Stage II according to the FIGO classification. The grading system proved superior with high significance (p less than 0.001) to the other predictors including each histopathologic parameter apart from vascular invasion (p = 0.01). All histopathologic parameters but two (differentiation into cell type and mitosis) exhibited a significant (p less than 0.01) decrease in survival with higher grade at the 5-and 8-yr controls. Patients in Stage II could be divided into groups with low, intermediate and high malignancy points. Both groups of extremes showed a marked and highly significant difference in survival rates compared with the intermediate group, and the grading system made it possible to predict 60% of the patients with acceptable specificity. In the group of high malignant tumors the system maintained a continual prognostic value even among patients still alive at the 5-yr control. (Author abstract) (50 Refs)

21. RADIATION-INDUCED TUMOR REGRESSION AS A PROGNOSTIC FACTOR IN PATIENTS WITH INVASIVE CERVICAL CANCER.

Hardt N, Van Nagell JR, Hanson M, Donaldson E, Yoneda J, Maruyama Y
(c/o van Nagell), Div. Gynecologic Oncology, Univ. Kentucky, Lexington, KY, 40536
Cancer; 49(1):35-39 1982

Radiation-induced tumor regression was evaluated as a prognostic factor in 200 patients with invasive cervical cancer treated at the University of Kentucky Medical Center during the yr 1973-1977. Radiation responses were classified as complete (Type A), intermediate (Type B), or incomplete (Type C) based upon pelvic examination findings 1 mo following completion of therapy. Patients with Type A response to radiation had a recurrence rate of 5%, as compared with 27% in patients with a Type B response and 85% in patients with a Type C response. The direct relationship between radiation response and the incidence of tumor recurrence was observed in all stages of disease. Seventy-five percent of patients with Stage IB and IIB disease and a Type C response to radiation developed recurrent cancer, and tumor recurrences were confined to the central pelvis in the majority of cases. Patients with keratinizing squamous cell cancers had the lowest incidence of

complete response to radiation. These findings suggest that careful observation of cervical cancer throughout radiation therapy can provide prognostically significant information concerning radiation-induced tumor regression. The therapeutic implications of this data are discussed. (Author abstract) (22 Refs)

HEAD AND NECK NEOPLASMS

22. A MONITORING SYSTEM TO PREDICT THE SENSITIVITY OF CARCINOMAS OF THE ORAL CAVITY TO RADIOTHERAPY (MEETING ABSTRACT).

Costa A, Silvestrini R, Molinari R
Istituto Nazionale Tumori, Milan, Italy
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

With the present study we proposed to investigate an indicator or a monitoring system to predict in the shortest time the response to radiotherapy. The 3H-thymidine labeling index (LI) was determined on 38 T2 or T3 squamous cell carcinomas of the oral cavity prior to and after 10 Gray (Gy) of treatment. For the LI determination small fragments obtained from biopsies were incubated at 37C for 1 hr in agitation with DNA-labeled precursor. Histologic sections were processed by autoradiography according to the stripping film technique. Three treatment protocols were used. All patients received fractionated treatment: 30-40 Gy/3-4 wk given as 5 daily fractions of 2 Gy. A first group of 23 patients continued the irradiation scheme up to 60-70 Gy; a second of 7 patients was submitted to surgery, and a third group of 8 patients received a 192Ir implant. A statistical difference (p less than 0.001) was observed between the median value of pretreatment LI0 (10%) and the median LI value after 10 Gy (3%). An inhibition of maliferative activity was observed in 29 of 38 tumors studied and an enhancement up to 2000 x in the other 9. The clinical relevance of the LI0 and of its variation after 10 Gy was evaluated for the first group of 23 patients homogeneously treated with external beam radiotherapy. The LI0 proved not to be indicative of the clinical response after radiotherapy. The reduction in proliferative activity after 10 Gy was also not indicative of early clinical response (tumor vol reduction), but it was significantly indicative of disease-free survival (DFS). In fact, patients with a LI reduction of more than 70% after 10 Gy had a probability of DFS at 42 mo significantly higher (p less than 0.005) than that observed for patients whose tumors showed a lower inhibition or an enhancement of LI0. (no Refs)

23. RESULTS OF EXTERNAL IRRADIATION AND INTERSTICIAL IRIDIUM APPLICATION IN CARCINOMA OF THE ORAL TONGUE AND THE FLOOR OF THE MOUTH (MEETING ABSTRACT).

Bolla M, Horiot JC, Combes PF, Lefur R, Pigneux J, Pourquier H, Schraub S
No affiliation given
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

The purpose of the following retrospective analysis, completed in January 1981, was to better specify the indications of exclusive radiotherapy and those of primary surgery in carcinomas of the floor of the mouth (FM) and of the oral tongue (OT). From January 1970 to December 1978, 239 carcinomas of the FM and 218 carcinomas of the OT were treated, falling into 23.4% T1, 47.3% T2 and 29.3% T3 for the FM among which 64% N0, and 19.3% T1, 47.2% T2 and 33.5% T3 for the OT, among which 83.1% N0. Patients with previous cancer or carriers of a second contemporary localization were excluded. The dose delivered was from 46 to 56 Gray (Gy) for external irradiation, and from 25 to 45 GY for curietherapy. The results concerning local and regional remission as well as survival are given according to an actuarial method (Byar 1977). Five yr actuarial loco-regional remission for the FM is 81% for T1, 62% for T2 and 37% for T3; for the OT it is 62% (T1), 53% (T2) and 43% (T3). The local and regional remission in the FM is higher than in the OT both for T1 and for T2. Actuarial survival without any sign for the FM is 65% (T1), 58% (T2), 30% (T3), and 66%, 51% and 27% for T1, T2 and T3 of the OT, without any significant difference between the two localizations. The gross rate of isolated lymph node recurrence is 7.1% and 5% respectively for the N0 of the FM and the OT, and 4.7% and 3% respectively for the N1. Analysis of local failures suggest that an association of radiation and surgery should be performed more often in T3, using surgery followed by radiotherapy. Some infiltrating T2 of OT should also derive some benefit from the same scheme. (no Refs)

24. T4NOMO GLOTTIC CANCER: AN ANALYSIS OF DOSE-TIME VOLUME FACTORS.

Harwood AR, Beale FA, Cummings BJ, Keane TJ, Payne D, Rider WD

Dept. Radiation Oncology, Princess Margaret Hosp., Toronto, Ontario, Canada

Int J Radiat Oncol Biol Phys; 7(11):1507-1512 1981

The influence of irradiation dose, field size, age, and extent of disease on the local control of glottic cancer that had extended beyond the confines of the larynx to either the thyroid cartilage, trachea, hypopharynx, or tongue (T4NOMO) was investigated. The 56 patients treated with radical radiotherapy with surgery for salvage between 1965 and 1977 were divided into two groups: T4 pyriform all had involvement of the hypopharynx with or without involvement of cartilage (14 patients); T4 cartilage had cartilage destruction and involvement of the trachea and base of the tongue (42 patients). The overall local control rate for the entire group was 56%. Local control was 67% in the T4 cartilage group at 5 yr compared with 19% in the T4 pyriform group. Actuarial local recurrence free rate at 5 yr was 42% for patients receiving less than 1,700 rad-equivalent therapeutic (ret) nominal standard dose (NSD) while it was 82% for those receiving more than 1,700 ret NSD. No difference in local control by irradiation was seen with different ages of patients or differing radiation field sizes. It was concluded that radical radiotherapy with surgery for salvage is a good method of treatment for T4 glottic cancer, particularly those who do not have hypopharyngeal involvement, and a minimum dose of 1,700 ret is necessary to achieve adequate local control by irradiation. (14 Refs)

25. SPLIT-COURSE RADIOTHERAPY OF CANCER OF THE LARYNX: TEN YEAR RESULTS OF A RANDOMIZED STUDY (MEETING ABSTRACT).

Holsti LR, Salmo M

Department of Radiotherapy and Oncology, University Central Hospital, Helsinki, Finland

UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

A randomized clinical trial was performed from 1965 to 1967 to compare the results of split-course treatment with those of continuous daily fractionated treatment. Forty-seven patients were treated with split-course therapy and 37 with conventional radiotherapy. The av treatment was 5000 rad in 5 wk in the continuous treated group and 5500 rad in 7 wk in the split-course group. The mean rest interval was two wk. Glottic and supraglottic carcinomas of all stages were accepted to the trial. The 5 and 10 yr survival rates of stage I and II were somewhat better in split-course group (70% and 53% respectively) than in the continuous treated group (56% and 40%). In stage III and IV the survival rates were similar (24% and 12-14%). No severe complications were observed in either group. An isoeffective curve was calculated by the method of least squares for ten yr survivors and for recurred cases in stage I and II. It was used to estimate the additional dose needed in split-course treatment to achieve the same effect as with continuous treatment. This recovered dose/day varied between 28 and 33 rad. The corresponding recovered dose calculated by Ellis equation was 15 rad/day. (no Refs)

26. RADIOTHERAPY IN NONLENTIGINOUS MELANOMA OF THE HEAD AND NECK.

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Cancer; 48(12):2599-2605 1981

Thirty-seven patients with superficial spreading or nodular melanoma of the head and neck treated with irradiation are reviewed. Twenty-one patients were referred within 3 mo of surgery. Six had an incisional biopsy followed by postoperative irradiation, four were locally controlled (1 dying of metastatic melanoma, 2 dying of intercurrent disease and 1 is alive and well), and two were not (both dead of melanoma). Fifteen patients had a local excisional biopsy (11 having tumor to the limits of the excision) followed by postoperative irradiation. Fourteen of the 15 had local control (3 had lymph node metastases and died, 3 died of distant metastases from melanoma, 7 are alive and well from 1-14 yr following treatment, and one is dead of intercurrent disease), and 1 had a local recurrence and subsequently died of metastatic melanoma. Sixteen patients were irradiated for local and/or regionally recurrent disease following unsuccessful surgery, and only two were successfully controlled by irradiation and are alive and well at 4 and 5 yr, respectively. Local control was 70% when a dose per fraction of greater than 400 rads was used, compared with 25% when a dose per fraction of less than 400 rads was used. It is concluded that nonlentiginous melanoma of the head and neck is not a radioresistant tumor and that local excision followed by high dose per fraction radiotherapy deserves further study in the management of melanomas of the head and neck. (Author abstract) (13 Refs)

27. FOUR YEARS EXPERIENCE WITH HYPERTHERMIA (HT) AND RADIATION IN CLINICAL PRACTICE (MEETING ABSTRACT).

Arcangeli G, Cividalli A, Lovisolo G, Nervi C, Tirindelli Dancoi D

Ist Med e di Ric Scient, Rome, Italy

UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Since 1976, microwave or RF HT has been employed in our institution in combination with radiation for several types of tumors according to two main different protocols. Fifty-one patients with 111 neck node metastases from head and neck cancer were irradiated with a multiple daily fractionation scheme (3 daily fractions of 2+1.5+1.5 Gray (Gy) day, 4 hr interval between fractions, 5 days/wk, av total dose 60 Gy). Heat was delivered at 42.5C, for 45 min, qod, immediately after the 2nd daily fraction. About half of these patients also received misonidazole (MIS) 2 hr before the 1st daily fraction (1.2 g/m2, total dose 12 g/m(2)). Local control rate appeared to be much higher in patients treated with multimodality protocols, especially when HT was also employed. In these cases, a complete clearance was obtained in more than 75% lesions. This response remained almost constant for the whole follow-up period (18 mo). No increased skin radiation reaction was observed. Twenty other patients with several types of radioresistant tumors (skin melanoma nodules or lymph node metastases, soft tissue sarcoma, etc) were irradiated with high dose fractions (ranging from 4-8 Gy) twice wk. Heat was delivered as above, immediately or 4 hr after radiation. All lesions responded well, and complete local control was obtained in about 2/3 cases. An increased radiation reaction on normal tissue was observed in some instances. (no Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

28. CHEMOTHERAPY-RADIOTHERAPY VERSUS CHEMOTHERAPY IN HODGKIN'S DISEASE WITH BONE MARROW INVOLVEMENT: RETROSPECTIVE ANALYSIS OF 32 CASES.

Andrieu JM, Cramer P, Asselain B, Tea N, Tricot G, Flandrin G, Jacquillat C, Bernard J

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Acta Haematol (Basel); 66(4):217-225 1981

A retrospective analysis was performed on 32 patients suffering from Hodgkin's disease with bone marrow involvement treated between 1972 and 1976. After six courses of chemotherapy (MOPP for 25 patients), we observed 20 complete remissions (62.5%), 8 lymph node partial remissions (bone marrow sterilization but persistence of pathological lymph nodes) and 4 failures. Among the 28 complete or partial responders, 17 received maintenance chemotherapy alone, 9 were submitted to 40 Gy and 2 to 20 Gy irradiations. Fifteen patients died and 8 relapses occurred - all in previously involved lymph node areas. Survival of complete and partial responders is significantly different ($p = 0.01$) according to whether they received maintenance chemotherapy alone (34.5%) or irradiation (75.7%). Disease-free duration is also significantly different ($p = 0.05$) according to whether the pa-

tients received maintenance chemotherapy alone (42.1%) or 40 Gy irradiation (100%). (Author abstract) (22 Refs)

29. 14. A SOUTHWEST ONCOLOGY GROUP: CHEMOTHERAPY VERSUS CHEMOTHERAPY PLUS RADIOTHERAPY IN TREATMENT OF STAGE III HODGKIN'S DISEASE.

Grozea PN, De Persio EJ, Coltman CA, Fabian CJ, Morrison FS, Gehan EA, Jones SE
Oklahoma Medical Res. Foundation, Dept. Medicine, Univ. Oklahoma, Coll. Medicine, 825 N.E. 13th St., Oklahoma City, OK, 73104
Recent Results Cancer Res; 80:83-91 1982

The Southwest Oncology Group (SWOG) performed a randomized study (SWOG 7518, CAR 2) of chemotherapy using 10 courses of nitrogen mustard, vincristine, procarbazine, and prednisone (MOPP) plus low-dose bleomycin (LDB), versus three courses of combined therapy, MOPP + LDB plus radiotherapy (XRT) from October, 1974, to April 1980, in pathologic Stage III Hodgkin's disease. The present report includes data on 136 registered patients, of whom 112 are fully or partially evaluable. At this preliminary analysis, complete remission rates are 82% for chemotherapy alone and 82% for combined treatment. There are no statistically significant differences in survival or relapse-free survival between the two treatment programs, and no specific trends for Stage IIIA versus IIIB. The estimated 3-yr survival rate for all patients was 82%. Toxicities are comparable when considering the highest grades. There was one case of acute myeloblastic leukemia on combined treatment. Preliminary evidence suggests that patients with nodular sclerosis histologic type are more likely to relapse on chemotherapy alone than on combined therapy. (Author abstract) (14 Refs)

30. SURVIVAL OF PATIENTS WITH LOCALIZED DIFFUSE HISTIOCYTIC LYMPHOMA.

Sweet DL, Kinzie J, Gaeke ME, Golomb HM, Ferguson DL, Ultmann JE
Univ. Chicago, Box 420, 950 East 59th St., Chicago, IL, 60637
Blood; 58(6):1218-1223 1981

Twenty-eight patients with previously untreated diffuse histiocytic lymphoma (DHL) were identified to be in pathologic Stage (PS) I (11), IE (3), II (8), or IIE (6) by exploratory laparotomy and splenectomy. Six patients were treated with total nodal radiotherapy; 14 with an extended mantle; 5 with an inverted Y or whole abdomen; and 3 with an involved field. Twenty-six patients achieved a complete remission (93%) and 2 patients had persistent local disease. The median survival and disease-free survival and for the complete response group are 56 and 51.5 mo, respectively. Ten of the 11 Stage I or IE patients had supradiaphragmatic lymph node disease. Patients with Stage I or IE disease (n = 14) demonstrated a median survival of 72.5 mo and a median disease-free survival of 69.5 mo; there was one disease-related death. Patients with Stage II or IIE disease (n = 14) demonstrated a median survival of 33 mo and median disease-free survival of 29.5 mo; there were 10 relapses or deaths. Patients in Stages I, IE, II, or IIE with infradiaphragmatic disease (n = 7) had a median survival of 36 mo, while patients with supradiaphragmatic presentation (n = 21) demonstrated median survival of 68 mo (p = 0.37). The data indicate that patients with diffuse histiocytic lymphoma with Stage I supradiaphragmatic lymph node disease are curable using radiotherapy alone, achieving a 93% 11-yr actuarial disease-free survival. Patients with Stage II or IIE disease are not readily curable with radiation therapy alone, achieving a 33% 11-yr actuarial disease-free survival; radiothera py with adjuvant chemotherapy or chemotherapy alone should be considered for this group. (Author abstract) (14 Refs)

31. IRRADIATION OF THE THYMUS REGION IN CHRONIC LYMPHOID LEUKEMIA. SEVEN CASES.

Floiras JL, Allain D, Turpin F
Departement de Radiotherapie et Unite d'Hematologie, Centre Rene Hugue-nin, 5, rue Gaston-Latouche, F 92211 Saint-Cloud, France
Nouv Presse Med; 10(39):3227-3229 1981

Seven patients with chronic lymphatic leukemia, B type, have been treated with thymic irradiation. A full remission was achieved in two and a partial one in four. No serious complications were noted during or after the irradiation. This treatment has proved efficient even after the failure of a previous chemotherapy and has permitted the resumption of any other therapeutic modality when the CLL is no more controlled. (Author abstract) (9 Refs) (In FRE)

32. SPLENIC IRRADIATION IN PROLYMPHOCYTIC LEUKAEMIA (MEETING ABSTRACT).

Oscier DG, Errington RD, Catovsky D, Goolden AW, Roberts P
Department of Radiotherapy, Postgraduate Medical School, Hammersmith Hospital, London, England
Br J Radiol; 56(644):140 1981

Prolymphocytic leukemia (PLL) is a chronic lymphoproliferative disorder characterized by massive splenomegaly and a high peripheral blood prolymphocyte count. In the original series of 15 patients, there was a poor response to alkylating agents and steroids, and only one out of six patients benefited from splenic irradiation. We have treated a further 12 patients with B-PLL with splenic irradiation on a 60Co unit using a weekly dose of 100 centi Gray (cGY) up to max total dose of 1000 cGy. The treatment was well tolerated and had to be interrupted because of thrombocytopenia in only one patient. Seven patients responded well to treatment. In each case the white cell count fell rapidly to normal levels and spleen size diminished throughout the treatment period. Five of the responding patients remain well from 6 mo to 8 yr following splenic irradiation. One remains in complete remission 18 mo post-splenectomy, following a second course of splenic irradiation, while two have died of unrelated causes. Four of the five non-responders have died as a result of their disease. Those patients whose peripheral blood prolymphocytes form more than 25% of mouse RBC rosettes seem more likely to respond. We consider that splenic irradiation should be the primary form of treatment for the majority of patients with PLL. (1 Ref)

MUSCULOSKELETAL NEOPLASMS

33. ROLE OF LUNG IRRADIATION IN THE ADJUVANT TREATMENT OF OSTEOSARCOMA.

van der Schueren E, Breur K
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Recent Results Cancer Res; 80:98-102 1982

Adjuvant lung irradiation (ALI) was tested in patients with osteosarcoma. All pa tients received treatment for the primary tumor which consisted of surgery, radiotherapy (RT), or RT with delayed surgery. Of a total of 86 patients, 44 controls received no further treatment; 42 patients received ALI (20

Gray, delivered in 10 sessions over 2 wk). The 5-yr survival rates (5SR) were 43% for patients treated with ALI and 28% for controls, with a significance at the 6% level. Among patients less than 17 yr old, 5SR were 48% after ALI and 28% for controls. In one treatment center the 5SR for ALI and control groups were 33% and 27%, respectively; among other centers the rates were 50% and 30%, respectively. Pediatric 5SR were as high as 61% after ALI. Survival of patients not receiving ALI was higher than for similarly treated patients in other recent studies. Variations in results among treatment centers, as well as the small number of patients studied, underscore the importance of multicenter studies of large patient populations for confirmation of results. Confirmation of the reported results would mean ALI must be combined with other agents, since the radiation dose cannot be increased. (15 Refs)

34. KAPOSI'S SARCOMA. AN UPDATE ON THE RESULTS OF EXTENDED FIELD RADIOTHERAPY.

Harwood AR
Princess Margaret Hosp., 500 Sherbourne St., Toronto M4X 1K9, Ontario, Canada
Arch Dermatol; 117(12):775-778 1981

This report reviews the results of extended field radiotherapy (EFR) in the treatment of Kaposi's sarcoma. During the 22-yr period that is under study, 54 patients with Kaposi's sarcoma were seen and 38 were treated with EFR. Thirty patients had spontaneous Kaposi's sarcoma and eight had received immunosuppressive therapy. Extended field radiotherapy is compared with both local methods of radiation and chemotherapy in the treatment of Kaposi's sarcoma. It was concluded that EFR is the treatment of choice because of its simplicity, high disease-control rate, and lack of complications in patients without systemic disease manifestations. (Author abstract) (5 Refs)

35. EFFECTS OF POSTOPERATIVE ADJUVANT CHEMOTHERAPY AND RADIOTHERAPY ON OVARIAN FUNCTION IN WOMEN UNDERGOING TREATMENT FOR SOFT TISSUE SARCOMA.

Shamberger RC, Sherins RJ, Ziegler JL, Glatstein E, Rosenberg SA (c/o Rosenberg) Surgery Branch, Div. Cancer Treatment, NCI, NIH, Public Health Service, U.S. Dept. Health and Human Services, Bethesda, MD, 20205
JNCI; 67(6):1213-1218 1981

Ovarian function was evaluated in 11 women 16 to 43 yr of age at treatment who received doxorubicin, cyclophosphamide, and high doses of methotrexate with or without radiotherapy in adjuvant therapy of soft tissue sarcoma. Five women (16-33 yr old) who received chemotherapy alone or combined with radiotherapy only at sites distant from the ovaries (chest wall, thigh, and leg) had minimal menstrual irregularities or temporary cessation of menses during therapy; cyclic menses returned promptly after therapy. Gonadotropin levels (expressed as means +- SD) [follicle-stimulating hormone (FSH), 10 +-5 mIU/ml; luteinizing hormone (LH), 10 +-4 mIU/ml] and 17beta-estradiol (E2) levels (means +- SD, 208 +-147 pg/ml) were normal. By contrast, four older women (ages 36-43 yr) who received similar treatment developed persistent amenorrhea with postmenopausal levels of gonadotropin (FSH, 108 +-29 mIU/ml; LH, 72 +-19 mIU/ml) and E2 (19 +-8 pg/ml). Two additional women (ages 21 and 39 yr) who received radiation (7,000 rad) to the pelvis plus chemotherapy developed prompt cessation of menses and became functional castrates (FSH, 77 and 80 mIU/ml; LH, 40 and 58 mIU/ml; E2, 10 and 19 pg/ml). However, this result would be expected from the radiation dose alone. The data demonstrated that ovarian dysfunction may follow the use of doxorubicin, cyclophosphamide, and high doses of methotrexate and that the injury is age related. (Author abstract) (35 Refs)

36. FRACTIONATED TOTAL BODY IRRADIATION FOR METASTATIC NEUROBLASTOMA.

Kun LE, Casper JT, Kline RW, Piaskowski VD
Dept. Radiology, Section Therapeutic Radiology, Medical Coll. Wisconsin, 8700 West Wisconsin Ave., Milwaukee, WI, 53226
Int J Radiat Oncol Biol Phys; 7(11):1599-1602 1981

Twelve children over 1 yr old with metastatic neuroblastoma involving the bone marrow and/or bone were treated with induction chemotherapy (cyclophosphamide and adriamycin, 6 courses in 4 mo), then those exhibiting complete clinical response were eligible for laparotomy and subsequent total body irradiation (TBI: 5x/w, total cumulative doses of 100-120 rad in 10-12 fractions over 12-25 days). Those with gross residual disease also received irradiation to residual tumor sites (2,400 rad in 16 fractions given concurrently with TBI). No maintenance therapy was given. Six children were evaluated following TBI: two girls, four boys; aged 1 2/12-6 yr. Five had adrenal primaries, one had massive retroperitoneal disease without an identifiable primary. Five patients had multiple sites of bony metastases. All six children demonstrated disease progression from 2-16 mo after cessation of chemotherapy, four between 2 and 7 mo. Total survival following diagnosis ranged from 9 to 47+ mo. All patients received additional chemotherapy after documented disease progression. Three additional patients received 80, 100, and 120 rad, respectively, in 10-rad fractions after disease progression following chemotherapy: no objective regression in clinical or radiographic disease was observed, although brief subjective responses of less than 4 wk were noted. Except for one patient who demonstrated a platelet nadir of 4,000, no patient demonstrated clinically significant hematologic toxicity. Because these results were not significantly different fro m those obtained with chemotherapy and surgery without TBI, the use of fractionated TBI for these children is not recommended. (14 Refs)

37. RADIOTHERAPY OF CARCINOMAS OF THE DORSUM MANUS.

Szabo P
Dermatologische Abteilung, 'Josa Andras' Komitatskrankenhaus zu Nyiregyhaza, Nyiregyhaza, Ungarn
Strahlentherapie; 157(4):242-244 1981

The author treated 54 patients with 55 local carcinomas of the dorsum manus. These cases represent 2.08% of all carcinomas. From 1961 to 1963, the unit TuR 80/VEB Dresden/ was applied. The conditions of irradiation were60 kV, 1.2 mm Al filter, focus-skin distance 7 cm. Since 1963, the patients were irradiated with the unit Dermopan/Siemens under the following conditions: 50 kV, 1 mm Al filter, focus-skin distance 5 cm. The individual doses were between 400 and 500 R. In the beginning, they were administered 3 to 5x per wk, later 3x per wk. The total dose amounted up to 5,000 or 6,000 R. After the radiotherapy, every patient was controlled continually and carefully and, if necessary, a follow-up treatment was executed. During a control period of 1 to 16 yr, 50 carcinomas of the dorsum manus were checked up. Two recurrences occurred during this period. This corresponds to 4% of all cases. The results were also perfect with regard to the cosmetic aspect. (Author abstract) (12 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

38. REPORT OF EXPERIECES WITH HIGH-DOSAGE SINGLE UPPER AND LOWER HALF-BODY IRRADIATION: I. INFLUENCE ON TUMOR; II. PULMONARY REACTION.

Huttner J, Eichhorn HJ
Robert-Rossler-Klinik, Lindenberger Weg 80, DDR-1115 Berlin-Buch, E. Germany
Radiobiol Radiother (Berl); 22(4):414-419 1981

Results of high-dosage half-body irradiation in 33 patients with inoperable small-cell bronchial carcinoma are reported. Each patient received upper half-body irradiation followed by lower body-half irradiation. Each half-body received 750-1,000 rads (av 870 rads) in a single dose. Local tumor irradiation of 3,000-4,000 rads was also administered. Five patients were alive after an av 14.1 mo. Twenty-eight patients died after an av 6.3 mo, and autopsies were performed in 27. Of these 27 patients, 8 were tumor-free 19 had persisting local tumor, and 23 had remote metastases. Metastases were multiple in occurrence and varied in size in each patient. Pulmonary reaction (PR) was found in 18/33 patients and appeared an av 4 mo after upper-body irradiation. PR was fatal invariably fatal within an av 5 wk. The av upper body dose was higher for patients developing PR (890 rads) than for those without PR (845 rads). Increased single-dose local irradiation of tumor tissue and increased-dose fractioned low-dose half-body irradiation were recommended for improved clinical results. (5 Refs) (In GER)

39. THE INFLUENCE OF FRACTIONATION ON THE SURVIVAL OF PATIENTS FOLLOWING PRIMARY IRR ADIATION OF BRONCHIAL CARCINOMAS.

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Strahlentherapie; 157(4):214-216 1981

One hundred fifty three patients with a local carcinoma limited to the thoracic region underwent irradiation with weekly doses of 1 x 5.0 Gy TD, 2 x 5.0 Gy TD, 4 x 2.5 or 5 x 2.0 Gy TD up to a total dose of generally 60.0 Gy TD. Collectives comparable in view of stages and histology did not show significant differences in 3-yr survival rates, though a tendency toward low doses were recognizable. (Author abstract) (7 Refs) (In GER)

40. MISONIDAZOLE COMBINED WITH RADIOTHERAPY IN THE TREATMENT OF INOPERABLE SQUAMOUS CELL CARCINOMA OF THE LUNG. A DOUBLE-BLIND, RANDOMIZED TRIAL (MEETING ABSTRACT).

Kjaer M, Panduro J, Hansen HH
Finsen Institute, Copenhagen, Denmark
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Sixty-seven patients with inoperable squamous cell carcinoma of the lung were randomized in a double-blind trial to receive split-course irradiation therapy, 40 Gray (Gy) in 10 fractions over 5 wk plus either placebo or oral misonidazole 1,200 mg/m2 on treatment days. The target area was the primary tumor, both hillar regions, mediastinum, and both supraclavicular regions. Thirty-three patients received misonidazole, 34 patients placebo. Mean observation time for the study was 10.1 mo, range 4-24 +mo. Thirty-one % of the patients in the misonidazole group obtained complete remission as compared to 29% in the placebo group. No difference could be demonstrated in the relapse pattern comparing the two groups. However, the duration of response was significantly shorter, and the death intensity significantly higher in the misonidazole than in the placebo group, median survival being 4.4 and 6.7 mo respectively. Eight patients in the misonidazole group (31%) developed sensoric neuropathy. One patient in the placebo group developed irradiation myelopathy of the Brown-Sequard type. Group comparison showed a significant relation between mean plasma misonidazole concentrations during therapy and the developement of neuropathy (p less than 0.05). It is concluded that the combination of misonidazole and irradiation therapy for inoperable squamous cell carcinoma of the lung has no effect on response rate and relapse pattern, but a significant unexplained adverse effect on response duration and survival. (no Refs)

41. INTENSIVE INDUCTION CHEMOTHERAPY USING VINDESINE (VD), CIS-PLATINUM (CDDP), ADRIAMYCIN (ADRI), VP 16 FOLLOWED BY EXTENDED FIELD IRRADIATION FOR SCLC (MEETING ABSTRACT).

Gunzer U, Bertling J, Bohndorf W, Brugger E, Richter E, Schmidt M, Trux FA, Wilk e J, Viereck W
Cancer Study Group, University Clinics, 8700 Wurzburg, W. Germany
UICC Conference on Clinical Oncology, October 28-31, 1981, Lausanne, Switzerland. International Union Against Cancer 131 pp., 1981.

Although small numbers of stage I patients with unexpectedly favorable survival without intensive combination chemotherapy became known in the literature, the dictum is still valid, that small cell lung cancer (SCLC) in most cases is a rapidly progressive disease which is wide spread by the time of dignosis. Nine previously untreated patients suffering from SCLC at the age of 28-60 yr including all Karnofsky's stages were admitted to the following therapeutical regimen: VD 3 mg/m2 iv day 0, 7; 50% dose red day 14, 21, 28; CDDP 100 mg/m2 iv day 1, 21 ADRI 50 mg/m2 iv day 2; 50% dose red day 23; VP 16 60 mg/m2 po day 7 to 11; 28 to 30. This chemotherapy was followed by extensive irradiation of primary tumor sites including adjacent lung areas, mediastinum, neck, axillae and prox abdominal lymphnodes (30 Gray (Gy), liver (15 Gy), CNS (30 Gy) and bone marrow sites involved. Six of 9 patients were clinically disease free prior to irradiation which then was surprisingly well tolerated. Three of 9 patients died during the course of chemotherapy between day 28-35, 2/3 from septicemia, 1/3 from intracranial hemorrhage. In none of them tumor was detectable at autopsy. Although, small in number our findings seem to indicate that an aggressive induction therapy at any cost - in respect to the supportive care - may provide a disease free status of SCLC. (no Refs)

42. THORACIC RADIATION THERAPY AND ADRIAMYCIN/CISPLATIN-CONTAINING CHEMOTHERAPY FOR LOCALLY ADVANCED NON-SMALL-CELL LUNG CANCER.

Eagan RT, Lee RE, Frytak S, Scott M, Ingle JN, Creagan ET, Nichols WC
Mayo Clinic, Rochester, MN, 55901
Cancer Clin Trials; 4(4):381-388 1981

One hundred nine patients with limited-stage unresectable non-small-cell lung cancer were treated with Adriamycin-cisplatin-based combination chemotherapy and thoracic irradiation. Of this number, 73 received chemotherapy (1 course) prior to irradiation and 37% (27/73) had tumor regression following chemotherapy alone. Sixty-eight percent of patients (73/107) experienced tumor regression following combined chemotherapy and irradiation. Age more than 65 yr, a malignant ipsilateral pleural effusion, and no response to chemotherapy alone were all strong negative prognostic factors. Three-yr survivals were as follows: all 109 patients, 14.0%; 89 patients with malignant pleural effusion, 17.0%; 71 patients with neither a malignant pleural effusion nor malignant ipsilateral supraclavicular adenopathy, 23.1%. (Author abstract) (14 Refs)

43. ESOPHAGO-PULMONARY TOXICITY FROM CONCOMITANT USE OF ADRIAMYCIN AND IRRADIATION.

Son YH, Kapp DS
Dept. Therapeutic Radiology, Yale Univ. Sch. Medicine, New Haven, CT
Conn Med; 45(12):755-759 1981

Three cases of severe irreversible pulmonary fibrosis and intractable but reversible esophagitis occurred after concomitant large fraction irradiation [3000 rad to mediastinum and supraclavicular regions, adriamycin (ADR) (40-75 mg iv) with cytoxan (1-1.9 g) and vincristine (1-1.9 mg) on day 1 every 3 wk] for small cell undifferentiated carcinoma of the lung. In all cases the onset of esophagitis was observed as early as wk 1 and 2. Radiographically demonstrable pneumonitis appeared by wk 10 and progressed steadily to fibrotic change. The side effects caused 2/3 patients to prematurely discontinue the planned six cycles of chemotherapy. Delaying the first dose of ADR for at least 1 wk after pulmonary irradiation may be beneficial. (18 Refs)

INSTRUMENTATION AND TECHNOLOGY

44. PHASE I TRIALS OF WR2721 IN COMBINATION WITH RADIATION THERAPY AND WITH THE ALKYLATING AGENTS CYCLOPHOSPHAMIDE AND CIS-PLATINUM.

Kligerman MM, Blumberg AL, Glick JH, Nelson DF, Glover D, Yuhas JM, Amols HI, Goodman RL
Dept. Radiation Therapy, Hosp. Univ. Pennsylvania, 3400 Spruce St., Philadelphia, PA, 19104
Cancer Clin Trials; 4(4):469-474 1981

Three Phase I trials of the radioprotector S-2(3-aminopropylamino) ethylphosphorothioic acid (WR2721) have accessed 60 patients. Study 1 is devised to determine the max tolerated dose (MTD) of a single dose of the protector 15 to 30 min before a single radiation treatment of a size used routinely in palliative management. Study 2 plans to determine the MTD for up to 15 daily doses of the drug over 3 wk during palliative radiotherapy. Also, the multiple-dose study will establish the MTD before palliative irradiation for fewer than five fractions a wk. Study 3 uses the existing single-dose MTD determined in Study 1 as pretreatment 15 to 30 min before cyclophosphamide or cis-platinum. Toxic symptoms include emesis, hypotension, hypertension, somnolence, and sneezing. Only one serious episode of hypotension, considered idiosyncratic, and one instance of moderate to severe vomiting have occured. Forty-one patients have been entered in Study 1 and a dose of 600 mg/m2 has been reached. The next step is to proceed to the planned highest level of 740 mg/m2. Of five patients in the multiple-dose study, one has been given, without toxicity, WR2721 at the level of 100 mg/m2 for 15 fractions over 3 wk. Fourteen patients are accessed to the alkylating agent study. Using protector doses of 450 mg/m2, a cyclophosphamide level of 1500 mg/m2 has been accomplished. However, two of three patients who received 450 mg/m2 of WR2721 before 120 mg/m2 of cis-platinum have shown moderate elevation of the serum creatinine, both of which returned to normal. (Author abstract) (4 Refs)

45. PROTECTIVE EFFECT OF L-CYSTEINE UPON LEUKOPENIC SYNDROME DUE TO RADIOTHERAPY.

Jingu K, Matsuura K, Busaka Y, Fukurono K, Ohtake H, Nakagawa E, Morita K, Tanaka M, Kawahira K, Yoshihara H, Sasaki K, Matsuoka J, Yano K, Tomita N, Sakuma A
Dept. Radiology, Kyushu Univ. Faculty Medicine, Kyushu, Japan
Nippon Gan Chiryo Gakkai Shi; 16(4):681-693 1981

Efficacy of L-cysteine (LC) for preventing and treating leukopenia was compared to that of inosine (IN) and a lactose-placebo (LP) in 152 patients (14 men, 138 women) who were treated with radiotherapy for cancer. The cancers included 88 uterine cervical cancers, 22 lung cancers, 40 breast cancers, and 2 ovarian cancers. The patients were administered 60Co irradiation for 6-7 wk (uterine cancer greater than 4,000 rads total, lung cancer greater than 5,000 rads total, breast cancer greater than 4,000 rads total). The patients in this double-blind controlled study were divided into three groups: Group 1 received LC (480 mg tid), Group 2 received IN (1,800 mg), and Group 3 received LP; all three groups were treated for 6-7 wk. Effects of treatment in maintaining WBC counts greater than 4000 /cubic mm were observed in 31/54 Group 1, 23/52 Group 2, and 13/46 Group 3 patients. Similar results were obtained by comparison of patients who were or were not treated with anticancer chemotherapy in addition to radiotherapy. Oral administration of LC was considered to be safe and effective in preventing and treating leukopenic complications of radiotherapy. (10 Refs) (In JPN)

46. EXPERIENCES IN DRESDEN WITH THE EFFECT OF SINGLE HALF-BODY IRRADIATION AS A SYMPTOMATIC MEASURE FOR ADVANCED TUMOROUS DISEASES.

Eberhardt HJ, Herrmann T, Schorcht J, Jochem I, Friedrich S, Lesche A, Voigtmann L
Strahlentherapieabteilung der Radiologischen Klinik, Medizinische Akademie 'Carl Gustav Carus' Dresden, Fetscherstr. 74, DDR-8019 Dresden, E. Germany
Radiobiol Radiother (Berl); 22(4):428-432 1981

Metastatic malignant neoplasms of various types were treated in 23 cases by palliative single half-body irradiation. Upper body irradiation (UBI) was given in 19 cases; lower body irradiation (LBI) was given in 3 cases; one patient received both UBI and LBI. Dose was 8 Gray in 18 cases and 5 Gray in 5

cases. Av hospital time was 34 days. Side effects included fatigue, vomiting, fever, muscle pain, and mucositis. The patient who received both UBI and LBI died of panmyelopathy and radiogenic pneumonitis. Subjective improvement was obtained in 2/10 mammary carcinomas (MC), 2/3 renal carcinomas (RC), 2/3 bronchial carcinomas (BC), 1/1 parotid carcinoma, and 1/1 gastric carcinoma. Nine cases were not influenced by treatment; five got worse. Objective improvement, primarily tumor shrinkage, was obtained in 4/10 MC, 1/3 RC, and 1/3 BC. Eight tumors showed no change; nine progressed. Results did not fulfill expectations. Combined UBI and LBI were abandoned. (no Refs) (In GER)

47. HEMATOLOGICAL CHANGES AFTER SINGLE HIGH-DOSAGE HALF-BODY IRRADIATION.

Hermann T, Friedrich S, Jochem I, Eberhardt HJ, Koch R, Knorr A
Strahlenbiologisches Labor der Radiologischen Klinik, Medizinische Akademie 'Carl Gustav Carus' Dresden, Fetscherstr. 74, DDR-8019 Dresden, E. Germany
Radiobiol Radiother (Berl); 22(4):438-443 1981

The effects of high-dosage half-body irradiation (HKB) on hematological systems were studied in 20 patients. HKB of 5-8 Gray were administered to the upper or lower half-body with a telecobalt apparatus. Total WBC counts were significantly reduced between days 6 and 14 after irradiation (pr). Lymphocyte counts dropped within 4 hr pr and remained low for at least 28 days. Thrombocyte counts dropped to a low at 14 days pr and rose thereafter. No tendency towards hemorrhage was noted. Serum activities of glutamic oxalic-acetic transaminase, glutamic pyruvic transaminase, and lactic acid dehydrogenase rose slightly during day 1 pr, due to release of enzymes from destroyed tumor cells. The erythroid parameters of hematocrit, Hb, and reticulocyte counts showed a slight decrease pr, but returned to normal within 4 wk. Transfusions were required only for tumor-induced anemia present before irradiation. Changes in hematologic parameters were not accompanied by infection or hemorrhage in any case. Results indicate that HKB was tolerated well by hemopoietic systems. Monitoring of hematologic before, during, and after HKB was recommended. (10 Refs) (In GER)

48. AN ANNULAR FOCUS ULTRASONIC LENS FOR LOCAL HYPERTHERMIA TREATMENT OF SMALL TUMORS (MEETING ABSTRACT).

Beard RE, Magin RL, Frizzell LA, Cain CA
Department of Electrical Engineering, University of Illinois, 1406 West Green Street, Urbana, IL, 61801
1981 IEEE Ultrasonics Symposium, October 14-16, 1981, Chicago, Illinois. Institute of Electrical and Electronics Engineers 122 pp., 1981.

A system for applying local hyperthermia employing ultrasonic transducers with annular focusing lenses gave better temperature uniformity in small fibrosarcomas than conventional unfocused transducers. The lenses were designed for ultrasonic frequencies of 3, 4, 5, and 9 MHz for tumors approx 6 mm in diameter. Tests in degassed water indicated that the focusing lenses concentrated approx 80% of the ultrasonic energy into an annular-shaped focus of 5 and 6 mm in diameter, located at a distance of about 2.5 to 3 cm in front of the lens. These transducers were used to locally heat sc PARA-7 fibrosarcomas in hamsters. Steady state temperature measurements indicated temperature gradients within the tumors of 0.5 to 1.0 C when the transducers employing annular-focused lenses were used versus gradients of 2.0 t o 2.3 C with 10 mm diameter unfocused transducers. (no Refs)

PRE-CLINICAL STUDIES

49. BROAD-SHOULDERED SURVIVAL CURVES OF A HUMAN MELANOMA XENOGRAFT. IMPLICATIONS FOR RADIATION THERAPY IN THE ABSENCE AND PRESENCE OF MISONIDAZOLE.

Rofstad EK, Brustad T
Norsk Hydro's Inst. Cancer Res., Norwegian Radium Hosp., Montebello, Oslo 3, Norway
Acta Radiol Oncol Radiat Phys Biol; 20(4):261-265 1981

A human malignant melanoma (EE) was irradiated in vivo in athymic nude mice, with subsequent assay of single cell survival in vitro. By assuming the survival curves for the hypoxic as well as for the aerobic cells in the tumor to be of the form S = exp(-D/D1) x (1-[1-exp(-D/D2)]n), theoretic survival curves were fitted to the experimental data for tumors irradiated in air-breathing mice. Assumptions were made about hypoxic fraction, oxygen enhancement ratio, sensitization by misonidazole, repair of potentially lethal damage, and reoxygenation, all based upon own experimental data on EE melanoma. Theoretic surviving fractions were calculated for several clinically relevant fractionation regimes, both for irradiation in the absence and in the presence of misonidazole. The results indicate that tumors with biologic parameters like those of EE melanoma are best treated with fractionation regimes with few fractions and high doses per fraction, whether misonidazole is present or not. (Author abstract) (28 Refs)

50. PROTECTIVE EFFECT OF CYCLOHEXIMIDE ON THE RESPONSE OF RAT HIND LIMBS TO X IRRADIATION.

Weissberg JB, Fischer JJ
Dept. Therapeutic Radiology, Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT, 06510
Radiat Res; 88(3):597-606 1981

To study cycloheximide (CHM) action and the possible role of protein synthesis in the in vivo radiation response of normal tissue, the radiation reaction of male Sprague-Dawley rat hind limbs exposed to single doses of x-rays following ip CHM administration was measured. Single doses of x-rays produced skin reactions and structural damage. When ip CHM (0.5, 1, 2, and 5 mg/kg) was administered immediately prior to irradiation, no effect on the levels or rate of skin reaction was observed over a 50-day interval. CHM also did not modify the level of structural damage to the hind limbs 50 and 100 days postirradiation. While CHM was not protective when given immediately before or after x-rays, it did modify radiation effect if given at least 6 hr prior to irradiation; max protection was observed at 12 hr. The pattern and extent of protection by CHM against acute skin reaction and long-term structural damage induced by x-rays were comparable. No hypotensive action of CHM was observed which could account for its radioprotective effect. (46 Refs)

REVIEWS

51. FAST NEUTRON RADIOTHERAPY: FOR EQUAL OR FOR BETTER?

Broerse JJ, Battermann JJ
Radiobiological Inst. TNO Rijkswijk, Antoni van Leeuwenhoek Hosp., Amsterdam, The Netherlands
Med Phys; 8(6):751-760 1981

The renewed application of fast neutrons in clinical radiotherapy has been stimulated by fundamental radiobiological findings. The biological effects of high LET radiation, including fast neutrons, are different from those obtained with x rays in at least three respects: the oxygen enhancement ratio, the sensitivity of cells at different phases of the cell cycle, and the contribution of sublethal damage to cell reproductive death. Furthermore, wide variations in relative biological effectiveness (RBE) have been observed for different tumors and normal tissues. Measurements of volume changes in human pulmonary metastases indicate that the RBE for slowly growing tumors which are generally well-differentiated is higher than that for poorly differentiated lesions. Six thousand patients have now been treated with fast neutron beams. The results of the clinical applications vary according to the method of application and to the type of cancer involved: treatment of inoperable malignancies of the salivary gland is very encouraging; the therapeutic gain is rather small for bladder and rectal cancers, soft tissue sarcomas and advanced carcinomas of the cervix; the responses of brain tumors are very disappointing. Most neutron radiotherapy applications have been less than optimal because of inadequate physical and technical conditions. Despite these difficulties, some interesting clinical data have become available. Due to the technical shortcomings, the possible advantages of fast neutrons are probably underestimated for many tumor sites. Well-designed clinical trials, preferably performed with high energy cyclotrons in clinical environments, will provide a decisive answer to the question of the usefulness of the new radiation modality. (Author abstract) (56 Refs)

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BREAST NEOPLASMS

1. TREATMENT RESULTS IN MALES WITH BREAST CANCER.

Robison R, Montague ED
(c/o Montague) Dept. Radiotherapy, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX, 77030
Cancer; 49(2):403-406 1982

Between 1948 and 1978, 39 previously untreated males with breast cancer received curative treatment at M D Anderson Hospital; an additional 30 males were referred for first treatment failure after outside definitive treatment. Of 21 patients

HE 20. 3173/2:

who were treated with mastectomy, 6 had radical mastec tomy alone, and 15 had radical mastectomy and postoperative irradiation. Of 18 patient who had less than radical surgery and postoperative irradiation to the chest wall and peripheral lymphatic areas, 7 had simple mastectomy, 3 excision biopsy and 8 had needle biopsy. Chest wall recurrences developed in four of six patients with grave signs treated with radical mastectomy, one had a recurrence in an unirradiated chest wall following peripheral lymphatic irradiation and three others had orthovoltage irradiation of 2,400, 3,000 and 4,200 rad. No local or regional recurrences had developed in patients treated with simple mastectomy, excision, or needle biopsy, and radiation therapy to the chest wall and peripheral lymphatics. The 10-yr disease-free survival (Kaplan-Meier) is 50% for the entire group, 70% for patients with histologically or a clinically negative axilla, and 34% for those patients with histologically or clinically positive axilla. Recommendations for the management of primary and regional disease are reviewed. (Author abstract) (5 Refs)

2. IATROGENIC PARESIS OF PERIPHERAL NERVES IN CONNECTION WITH BREAST AMPUTATION AND SUBSEQUENT RADIOTHERAPY.

Zenke W
Krankenhaus Friedrichroda-Waltershausen, 5812 Waltershausen, W. Germany
Z Aerztl Fortbild (Jena); 75(19):892-893 1981

Iatrogenic paresis as a result of breast amputation and subsequent radiotherapy is reported in 11 cases. Cases included two of postoperative paresis (POP) of the brachial plexus, three of surgery-related paresis (SRP) of the long thoracic nerve, and six of paresis of the brachial plexus due to radiation treatment. Both cases of POP were due to the position of the arm maintained during radical mastectomy; both resolved within 2-3 mo. SRP resulted from damage to the long thoracic nerve during surgery; in two of these patients shrinkage of the capsule of the shoulder joint was noted, along with skeletal distortions. Radiation-induced paresis (RIP) was total in five cases and partial in one case. RIP developed as a late effect 4-13 yr after radiation exposure. The following recommendations are made: (1) reducing abduction of the arm as much as possible during resection of lymph nodes should reduce the risk of POP; (2) passive physiotherapy should reduce shrinkage of the capsule of the shoulder joint; and (3) better calculation of radiation dose fractions, radiation times, and radiation field should reduce the risk of late paresis. (8 Refs) (In GER)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. CEREBELLAR HEMANGIOBLASTOMAS.

Sung DI, Chang CH, Harisiadis L
Dept. Radiation Oncology, Allegheny Valley Hosp., 1301 Carlisle St., Natrona Heights, PA, 15065
Cancer; 49(3):553-555 1982

Between 1950 and 1976, 24 patients with cerebellar hemangioblastomas received postoperative radiation therapy. In retrospect, the low-dose radiotherapy that was practiced in the 1950 s and early 1960s has been associated with inferior survival rates. Since 1963 and with increased awareness of the effects of radiotherapy, patients receiving high-dose irradiation postoperatively have generally survival longer. Postoperative radiotherapy is used whenever the neoplasm has not been totally excised. This is more likely to occur with solid hemangioblastoma and neoplasms arising in the brain stem. In addition, radiotherapy should be used when the tumor recurs after total excision. The recommended dose is in the range of 4,500-5,000 rad in 4 1/2-5 weeks. (Author abstract) (11 Refs)

4. PRIMARY MALIGNANT CEREBELLAR ASTROCYTOMAS IN CHILDREN: A SIGNAL FOR POSTOPERATIVE CRANIOSPINAL IRRADIATION.

Salazar OM
Div. Radiation Oncology, Univ. Rochester Cancer Center, P.O. Box 647, Rochester, NY, 14642
Int J Radiat Oncol Biol Phys; 7(12):1661-1665 1981

Therapeutic results and natural history of 13 cases of malignant astrocytoma of the cerebellum (MAC) are reported. Eight cases involved primary pure malignant astrocytomas; five cases involved mixed tumors in which the malignant astrocytoma component predominated. All tumors had been surgically and histologically confirmed and had been treated with 60Co irradiation. Seven patients were treated with craniospinal irradiation (CSI) consisting of 4,500 rads to the whole brain, a 1,000 rad booster to the posterior fossa, and 3,000-4,000 rads to the spinal axis given over five weekly treatments. Six patients received only cranial irradiation (CI); four of these received only partial CI. Median age of all patients was 9.8 yr. Male:female ratio was 1.6. Median survival (MS) was 20 mo. MS for patients receiving CI was 10 mo compared with 48 mo for patients receiving CSI. At reporting time six CSI patients were alive with no evidence of disease; one CI patient was alive with disease. All other patients had died. Five CI patients developed spinal subarachnoid dissemination after a median 9.6 mo. None of the CSI patients developed spinal metastases. Results suggest that MAC should be treated by CSI, rather than by more restricted radiotherapy. (26 Refs)

5. ULTRA-RAPID HIGH DOSE IRRADIATION SCHEDULES FOR THE PALLIATION OF BRAIN METASTASES: FINAL RESULTS OF THE FIRST TWO STUDIES BY THE RADIATION THERAPY ONCOLOGY GROUP.

Borgelt B, Gelber R, Larson M, Hendrickson F, Griffin T, Roth R
Dept. Radiation Therapy, Univ. Texas System Cancer Care Center, M. D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
Int J Radiat Oncol Biol Phys; 7(12):1633-1638 1981

Ultra-rapid high dose irradiation (UHDI) was compared with more prolonged high dose irradiation (PHDI) in two sequential Phase III cooperative studies of 1902 patients with brain metastases of breast, lung, and other cancers. In the first study patients received either 1,000 rads in a single dose or 3,000 or 4,000 rads in 2-4 wk. Results from 155 patients (26 in the 1,000 rad arm and 112 in the 3,000-4000 rad arm) were evaluated. In the second study patients received 1,200 rads in two days or 2,000 rads in 1 wk. Results from 64 patients (33 in the 1,200 rad arm and 31 in the 2,000 rad arm) were evaluated. Overall improvement rates were 47% in the first study and 46% in the second. UHDI produced improvement in neurologic function, promptness of improvement, morbidity rates, and median survival times comparable to those produced by PHDI. Duration of improvement, time to progression of neurological status, and rate of neurological improvement were generally less among patients receiving 1,000 or 1,200 rads than in patients receiving 3,000 or 4,000 rads. Results suggest that UHDI is not as effective as PHDI as palliative treatment of brain metastases; UHDI is recommended only for patients who cannot tolerate more protracted therapy. (7 Refs)

6. SMALL CANCERS OF THE ESOPHAGUS. A SERIES OF 31 CASES.

Peix JL, Burnon D, Baulieux J, Boulez J, Donne R, Maillet P
Clinique Chirurgicale A, Hopital de la Croix-Rousse, 69317 Lyon Cedex 1, France
Lyon Chir; 77(6):345-348 1981

Small cancer of the thoracic segment of th esophagus was diagnosed in 31 patients (29 men and 2 women, av age 58 yr). The symptoms included dysphagia in 26 patients, epigastric or retrosternal pains in 10 and dyspepsia in 3. The x-ray examination gave negative findings in 2/31 patients. Endoscopy with Lugol's solution revealed all tumors. Esophagogastrectomy by abdominal and thoracic approach was performed in 30 cases, and the colon was used for reconstruction in 1 patient with esophageal stenosis. The postoperative mortality rate was 1/31. Nine of the 31 patients were submitted to preoperative telecobalt therapy (total dose 2,000-4,000 rads, mean 3000 rads), 8 others to postoperative telecobalt therapy (mean dose 4,500 rads). Carcinoma in situ was found in 4 patients, microinvasive carcinoma (Stage I) in 11; Stage II was diagnosed in 14 patients, and no tumor was found at surgery in 2 patients subjected to preoperative radiotherapy. The tumor size was below 4 cm in 30 patients, and it was 7 cm in 1. None of the patients had lymph node metastases. The 1-, 3-, 5-and 10-yr survival rates were 26/27, 11/21, 9/18 and 6/7, respectively. The findings indicate that the prognosis of small (early) esophageal cancer is better that of esophageal carcinoma diagnosed at an advanced stage. (15 Refs) (In FRE)

7. BLEOMYCIN AND RADIOTHERAPY IN NONRESECTABLE THORACIC OESOPHAGEAL CARCINOMA.

Appelqvist P, Silvo J
Dept. Radiotherapy, Univ. Central Hosp., Haartmanikatu 4, 00290 Helsinki 29, Finland
Strahlentherapie; 157(6):371-374 1981

The survival rates of nonresectable thoracic esophageal carcinoma patients were studied in 50 patients treated by radiotherapy and by a combination of radiotherapy and bleomycin. The patients of two series were very similar. The 1-yr survival rates were 21 and 0%, in radiotherapy and in radiotherapy with bleomycin group, respectively. In the literature, there were only few reports from survival figues of patients with esophageal carcinoma treated with bleomycin in combination with radiotherapy. The authors concluded that the combination of bleomycin and radiotherapy has very limited effect on advanced esophageal carcinoma. The survival rate after this combination therapy is not better than with radiotherapy alone, if bleomycin and radiotherapy are used with reduced doses and without severe complications. (Author abstract) (30 Refs)

8. OXYGEN PRESSURE IN STOMACH ADENOCARCINOMA.

Kir'ianov IIu, Sutiagin AG, Alipchenko LA
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 26(11):12-15 1981

Oxygenation of tumor cells was studied in 67 patients with adenocarcinoma of the stomach. All patients were in Stage III of the disease. Of 67 patients, 50 received surgery alone (Group 1) and 17 received preoperative distant radiotherapy (single dose 200 or 400 rads, 5x/wk, total dose 4,000-4,500 or 2,000 rads) and surgery (Group 2). Surgery was performed 1-1.5 mo after the completion of radiotherapy. Polarographic measurements of oxygen pressure (pO2) showed the presence of anoxic regions in nonirradiated adenocarcinomas. The av pO2 value in Group 1 was 23 mm Hg, compared with 29 mm Hg in Group 2. The number of hypoxic regions in irradiated adenocarcinomas was small but for nonirradiated tumors it was bigger. Improved oxygenation of irradiated adenocarcinomas could be explained by inhibition of oxygen consumption in irradiated cells. (7 Refs) (In RUS)

9. 2,045 CASES OF RECTAL CANCER TREATED BY SOLE, PREOPERATIVE OR PALLIATIVE ENDOCAVITARY CONTACT RADIOTHERAPY. STATISTICAL RESULTS WITH THE HELP OF A MODERN CLASSIFICATION OF CARCINOMA OF THE RECTUM.

Parturier-Albot M, Albot G
8, rue des Saints-Peres, 75006 Paris, France
Ann Gastroenterol Hepatol; 17(5):313-320 1981

Patients with rectal cancer were treated with endocavitary contact radiotherapy (ERT) alone or combined with surgery. Palliative ERT was administered to other patients. Cancers were classified as alpha (localized in the mucosa), beta (spread to muscularis mucosa), gamma1 (spread to submucosa), gamma2 (spread to muscularis, Duke's Class A), and delta (spread to serosa, Duke's class B). ERT alone resulted in cures of 211/214 type alpha cancers, 316/318 beta, 548/604 gamma1, 108/532 gamma2, 5/377 delta, and 1,188,2,045 overall. For type alpha, beta, gamma1, gamma2, and delta rectal cancer patients treated with combined ERT and surgery, cures were obtained in 1/1, 1/1, 48/48, 375/417, 241/318 patients, respectively. Overa ll, radiosurgery produced cures in 666/785 patients. Cures observed in 279 aged or handicapped patients treated with contact radiotherapy alone did not significantly differ from general results: type alpha, 100%; type beta, 100%; type gamma1, 77.33%, type gamma2, 16.47%, and type delta, 3%. In 165 operable aged or handicapped patients, combined used of ERT and surgery produced results similar to those found for the general population. Palliative ERT in 41 patients produced improvements in their general state of health following each ERT application; patient survival was increased. (45 Refs) (In FRE)

10. RADIOTHERAPY OF UNRESECTABLE PANCREATIC CARCINOMA: A SIX YEAR EXPERIENCE WITH 104 PATIENTS.

Whittington R, Doltelbower RR, Mohiuddin M, Rosato FE, Weiss SM
Dept. Radiation Therapy and Nuclear Medicine, Thomas Jefferson Univ. Hosp., Philadelphia, PA, 19107
Int J Radiat Oncol Biol Phys; 7(12):1639-1644 1981

Results of treatment of 104 cases (66 men and 38 women, 38-82 yr old, median 62 yr old) of unresectable carcinoma of the pancreas are reported. Thirty-eight patients received palliative radiotherapy (RT); 20 of them also received chemotherapy (CHT). Palliative therapy produced control of primary tumor in 3/35 patients, palliation of symptoms in 65%, complete pain relief in 45%, and partial pain relief in 9%. Median survival was 5 mo. Death resulted in 15 cases from uncontrolled primary tumor; one patient was alive after 10 mo. Sixty-six patients received precision high-dose radiotherapy (PHD); 18 of the patients also received 125I implants (IP). PHD consisted of 5,000 rads to the tumor and surrounding area delivered over 5.5 wk, followed by 1,500 rads delivered to the tumor only. Seven patients receiving IP also received 500 rads as a single preoperative dose on the day of surgery or 1 day before. IP

was calculated to deliver 12,000 rads to the tumor over the period of complete decay. Local control of tumor was achieved in 33% of patients receiving only PHD and in 93% of those receiving PHD and IP. Adjunctive chemotherapy did not improve local control in the PHD-only group. Only 1/7 IP patients receiving preoperative irradiation (PI) developed implant-related metastases, compared with 5/7 not receiving PI. Palliation of symptoms was comparable in all groups. Results indicate the possibility of local control of pancreatic carcinoma with doses greater than 6,000 rads using IP. (12 Refs)

GENITOURINARY NEOPLASMS

11. RADIOTHERAPY AND CYSTECTOMY FOR T3 BLADDER CARCINOMA.

Hall RR, Heath AB
Dept. Urology, Freeman Hosp., High Heaton, Newcastle upon Tyne NE7 7DN, England
Br J Urol; 53(6):598-601 1981

The survival of 102 patients with category T3 transitional cell carcinoma of the bladder treated by pre-operative radiotherapy and radical cystectomy has been analyzed according to the degree of down-staging of tumor as assessed by the depth of infiltration of cancer in the operative specimen. Five-yr survival was 60% for patients showing evidence of down-staging, compared with 30% when persistent deeply invasive tumor was present at the time of cystectomy. Analysis of available data suggests that survival of patients with category T3 bladder cancer is determined by the response of the tumor to initial radiotherapy rather than the dose of radiotherapy or the addition of cystectomy. Despite radical treatment, the survival of patients with locally advanced bladder cancer is poor; as an alternative, more effective forms of therapy should be sought. (Author abstract) (9 Refs)

12. HALF-BODY IRRADIATION IN THE TREATMENT OF METASTATIC PROSTATIC CARCINOMA.

Rowland CG, Bullimore JA, Smith PJ, Roberts JB
(c/o Smith) Dept. Urology, Bristol Royal Infirmary, Marlborough St., Bristol BS2 8HW, England
Br J Urol; 53(6):628-629 1981

High dose radiation therapy given as a single fraction to the upper and lower halves of the body gives effective palliation for metastatic solid tumors. This treatment modality appears to be particularly effective in tumors which may have a slow doubling time such as carcinoma of the prostate. Fifty-two patients with metastatic carcinoma of the prostate involving the skeletal system have received half-body irradiation. All had prior treatment with additive hormones or orchiectomy, and the majority had received localized irradiation and/or chemotherapy. Significant immediate pain relief was achieved in 42 out of 52 patients (80%). This pain relief was maintained until death in 29 out of 43 patients (67%). Pain relief in responders appears to occur within 24 to 48 hr of treatment. (Author abstract) (5 Refs)

GYNECOLOGIC NEOPLASMS

13. THE MOVING-STRIP TECHNIQUE IN THE TREATMENT OF OVARIAN CANCER.

Hawliczek R, Kogelnik HD, Karcher KH, Binder W, Szepesi T
Universitatsklinik fur Strahlentherapie ung Strahlenbiologie Wien, Alser Strasse 4, A-1097 Wien, Austria
Wien Klin Wochenschr; 93(22):695-701 1981

Radiotherapy using the moving-strip technique (MSRT) in the treatment of ovarian cancer is discussed. MSRT is recommended as the principle postoperative therapy in Stages Ia, Ib, and II and asymptomatic Stage III. MSRT after successful polychemotherapy is recommended for Stages Ic and IIc and symptomatic Stage III with residual tumor larger than 2 cm. Prognosis depends on completeness of surgery, patient age, histology, tumor grade, and effectivenes of treatment. (36 Refs) (In GER)

14. COMBINATIONS OF RADIOTHERAPY (EXTERNAL AND CURIETHERAPY) ALONE IN CANCERS OF THE CERVIX.

Horiot JC, Ibrahim E, Aupecle P, Chaplain G, Sentenac I, Nabid A
Unite de radiotherapie, Centre Georges-Francois Leclerc, rue du Professeur-Mario n, F 21034 Dijon Cedex, France
Rev Med Suisse Romande; 101(10):783-789 1981

Radiotherapy (RT) alone can be used to treat certain types of cervix cancer. Guidelines used in determining the combination of external radiation (ER) and curietherapy (CT) administered include the following: ER is always administered prior to CT, the relative proportion of ER and CT is determined by the volume of the tumor and the probability of lymphatic metastasis, the amount of ER used depends on the tumor volume and the probability or certainty (lymphography-positive cases) of lymphatic metastasis. Combinations of RT allow the precise individualization of treatment. Advantages of RT and RT plus surgery are considered. Surgery should be used in cases of extensive intra-epithelial carcinomas, microinvasive carcinomas, certain endocervical cancers, and neoplasms with invasion of the cervix and vagina not suited to brachytherapy. Compilation of results of previously reported studies allowed the analysis of the efficacy and safety of RT alone in the treatment of 818 patients with cervix cancer. In Stage I and IIA patients, mild or severe complications were produced by RT in 15% and 3% patients, respectively. Digestive complications were encountered in 10% of the RT-treated patients. (no Refs) (In FRE)

15. RESULTS OF RADIATION AND COMBINED THERAPY OF CERVIX CANCER IN PATIENTS YOUNGER THAN 35 YEARS.

Vishnevskaia EE
Res. Inst. Oncology and Medical Radiology, Minsk, USSR
Med Radiol (Mosk); 26(11):15-19 1981

Results of treatment in 134 patients less than 35 yr old with cervix cancer are reported. Majority of the patients had squamous cell carcinoma; 80 were in Stage I, 39 were in Stage II, 13 were in Stage III, and 2 were in Stage IV. Sixty-nine patients in Group 1 were subjected to Wertheim's operation in combination with pre- or postoperative continuous or split-course irradiations; 65 patients in Group 2 were subjected to distance and interstitial radiotherapy alone. Complications were observed in 50% of the patients from Group 1 and in 32.7% of the patients from Group 2. Av duration of hospital stay in Groups 1 and 2 was 59.9 and 46.6 days, respectively.

The 5-yr survival rates in Group 1 were 92.9% for Stage I, 50% for Stage II, and 50% for Stage III. The corresponding survival rates in Group 2 were 100%, 83.3%, and 50%, respectively. (2 Refs) (In RUS)

16. THE IMPACT OF LYMPH NODE STATUS ON SURVIVAL IN CERVICAL CARCINOMA.

Hammond JA, Herson J, Freedman RS, Hamberger AD, Wharton JT, Wallace S, Rutledge FN
Ontario Cancer Foundation, Victoria Hosp., 375 South St., London, Ontario, Canada
Int J Radiat Oncol Biol Phys; 7(12):1713-1718 1981

The relationship between results of lymphangiography (LAG) and other parameters and survival time was studied retrospectively in 215 patients with cervical carcinoma (CC) in Stages IB-IIIB. LAG results were classified as positive (LAG+) or negative (LAG-). All patients received external radiotherapy using a standard 15 x 15 cm pelvic field or, in patients with metastatic lymph nodes, an extended field. Internal radium implants were used when possible. Patients with large pelvic tumors who were LAG- were randomized to receive standard-field or extended-field external irradiation. Correlation of staging and LAG factors indicated three risk groups: good risk patients were Stage IIA or IIB and LAG- and av disease-free survival time (DFS) was greater than 92 Intermediate risk patients were Stage IIB and LAG+, or Stage IIIA or B and LAG-; av DFS was 31 mo. Poor risk patients were Stage IIIA or B and LAG+; av DFS was 11 mo. Among all three risk groups DFS was longer for those patients receiving radium implants. DFS was increased in LAG+ patients but not LAG- patients by the use of an extended radiation field. The 2-yr failure rate was 69.0% for LAG+ patients and 31.3% for LAG- patients. Persistent disease was found in 22.7% of LAG+ patients and 10.7% of LAG- patients. LAG status correlated with stage of disease. Results indicate that LAG is useful for defining high-risk patients with cervical carcinoma. (9 Refs)

17. LOCAL TUMOR CONTROL AND THE SUBSEQUENT INCIDENCE OF DISTANT METASTATIC DISEASE.

Anderson P, Dische S
(c/o Dische) Marie Curie Res. Wing Oncology, Regional Radiotherapy Centre, Mount Vernon Hosp., Northwood, Middlesex HA6 2RN, England
Int J Radiat Oncol Biol Phys; 7(12):1645-1648 1981

The relationship between local tumor control (LTC) and subsequent incidence of metastases was studied in 73 patients with carcinoma of the bladder (CB) and in 122 patients with carcinoma of the uterine cervix (CC) in Stages IIB, III, and IV. Patients in both groups were randomized to radiotherapy in hyperbaric oxygen or in air. CB patients received radiation to the bladder and lymphatic drainage of the true pelvis. CC patients received radiation to the cervix and body of the uterus, true pelvis, and iliac nodes. A strong positive correlation was found between LTC and survival. A life table of patients with CC showed a plateau of metastasis-free survival (MFS) at approx 70% for patients in whom LTC had been achieved, compared with a plateau at approx 10% for those in whom LTC was not achieved. Similar results were shown by a life table of patients with CB. Eighteen of 20 patients with CC who had never been classified as tumor-free during treatment died within the first 12 mo of treatment. Data suggested that most patients with failure of LTC would have developed metastases if they had survived long enough. Although detecting a reduction in the incidence of metastases as a result of improved LTC would be difficult, the importance of LTC in preventing metastases is stressed. (4 Refs)

HEAD AND NECK NEOPLASMS

18. MALIGNANT INTRAOCULAR TUMORS.

Brady LW, Shields JA, Augsburger JJ, Day JL
Dept. Radiation Therapy and Nuclear Medicine, Hahnemann Medical Coll. and Hosp., MS-200, 2300 North Broad St., Philadelphia, PA, 19102
Cancer; 49(3):578-585 1982

The role of the radiation therapist in the management of malignant intraocular tumors is changing. With more active identification of malignant intraocular tumors, and a better recognization of the manner in which one can deal with problems of radiation sensitivity, radiation techniques of all sorts will be more actively employed in the treatment of these tumors. Special techniques must be selected for appropriate circumstances of management in order to diminish to an absolute minimum the impact upon the lens, the impact upon visual acuity and the impact upon the cornea. Cobalt-60 plaques are being used more commonly in the treatment of melanomas of the choroid, and the role for radiation therapy in the management of retinoblastoma is changing markedly to where it may be used as the primary treatment program rather than enucleation. In metastatic disease involving the uveal tract, radiation therapy has assumed the most important role for management. Chemotherapy should be considered as an active adjuvant in the management of not only those individuals with retinoblastoma but also in those identified circumstances where metastases to the uveal tract are being treated. The role for chemotherapy or immunotherapy in malignant melanoma is unclear. (Author abstract) (26 Refs)

19. LYMPHADENECTOMY AS A DEFINITIVE MANAGEMENT OF THE RESIDUAL LESION IN THE NECK AFTER RADIOTHERAPY FOR NASOPHARYNGEAL CANCER - AN ANALYSIS OF 48 CASES.

Xu G, Li Q, Hu Y, Cai W, Qin D, Yan J, Wu X, Gu X
Cancer Inst., Chinese Acad. Medical Sciences, Beijing, People's Republic of China
Zhonghua Zhongliu Zazhi; 3(2):123-125 1981

The residual lesion in the neck after radiotherapy for nasopharyngeal cancer is difficult to treat, either by further radiotherapy or by chemotherapy. Results of treatment by lymphadenectomy of 48 cases during or after radiotherapy are described. Local lymph node excision was performed in 43 cases (40 complete, 3 partial) and in bloc dissection in 5 cases. Of 34 cases followed for over 2 yr the 3-yr survival rate was 60% (18/30) and the 5-yr survival 50% (11/22). Postoperatively only one case in this series developed local recurrence and there were no serious complications. It was concluded that lymphadenectomy under certain conditions can be safe and effective in treating residual cervical lesion after radiotherapy for nasopharyngeal carcinoma. (no Refs) (In CHI)

20. FAST NEUTRONS IN THE TREATMENT OF SALIVARY GLAND TUMORS.

Kaul R, Hendrickson F, Cohen L, Rosenberg I, Ten Haken R, Awschalom M, Mansell J
Dept. Radiation Oncology, Michael Reese Hosp. and Medical Center, 29th St. and E llis Ave., Chicago, IL, 60616
Int J Radiat Oncol Biol Phys; 7(12):1667-1671 1981

Results of fast neutron irradiation (NI) in 22 patients in an ongoing Phase II study are reported. Median patient age was

55 yr (range 24-79 yr). Tumors originated in a major salivary gland in 17 cases (including 15 in parotid and 2 in submandibular glands) and in a minor salivary gland in 5 cases. All tumors were carcinomas except one mixed type. Treatment was planned on an individual basis. NI delivered 24.0 Gray over a period of 6 wk to an area including at least a 1 cm margin around the tumor. Four patients received an initial wide-field irradiation of 45.0 Gray with photons followed by a booster dose of 7.5 Gray in five fractions over 2-3 wk. Of seven patients receiving NI as primary therapy, one showed recurrence in the target volume and pulmonary metastases (PM), one patient developed only PM, and five patients were alive and tumor-free after 1-3 yr. Of three patients with postoperative residual disease who received NI, one died of persisting disease after 3 mo, and two were alive and tumor-free after 2 yr. Of six patients receiving NI after two to nine surgical excisions, five were alive and tumor-free after 1-3 yr and one patient with a mixed-type tumor was alive with 20% regression of a pharyngeal mass and disappearance of neck mass after 27 mo. Of three patients treated with NI after surgery and conventional irradiation, all died within 1 yr of treatment. Of four patients receiving NI boosting after photon irradiation, only one was alive and tumor-free after 3 yr. Results suggest improved local control of salivary tumors with NI. (15 Refs)

21. DISCRIMINANT ANALYSIS OF RADIATION THERAPY PROCEDURES: THE PATTERNS OF CARE PROCESS SURVEY FOR CARCINOMA OF THE LARYNX.

MacLean CJ, Davis LW
Radiation Oncology Study Center, American Coll. Radiology, Philadelphia, PA
Cancer; 49(2):229-233 1982

Discriminant analysis was applied to larynx data from the Patterns of Care Study (PCS) in order to evaluate and classify radiation therapy procedures. Since PCS has recorded information on a large number of separate procedures, a method was needed to treat them coherently. Discriminant analysis provided such a method through a comprehensive score of performance. The particular discriminant score used was calculated from the contrast between facilities with and without radiation therapy resident training programs. Because residents drastically affect the practice of radiation therapy in a facility, this factor provided a foundation for analyzing the procedures themselves. Results of the discriminant analysis were used to derive a condensed list of generalized procedural criteria which contains almost all the discrimination information of the original procedures and which elucidates their relative importance and the relations among them. (Author abstract) (10 Refs)

22. THE VALUE OF ADJUVANT MISONIDAZOLE IN THE DEFINITIVE IRRADIATION OF ADVANCED HEAD AND NECK SQUAMOUS CANCER: AN RTOG PILOT STUDY (78-02).

Fazekas JT, Goodman RL, McLean CJ
Dept. Radiation Therapy and Nuclear Medicine, Thomas Jefferson Univ. Hosp., Philadelphia, PA, 19107
Int J Radiat Oncol Biol Phys; 7(12):1703-1708 1981

Local tumor response and neurotoxic effects of misonidazole (2-nitro-1-imidazole: MA) were determined in a Phase II nonrandomized study. Fifty patients (39 men, 11 women, 31-78 yr old, av age 56 yr) with squamous cancers of the oral cavity, oropharynx, supraglottic larynx, or hypopharynx received MA as an adjunct to radiotherapy (RT). MA (2.5 g/square meter, reduced to 2.0 g/square meter after analysis of the first 30 patients) was administered, followed by RT (250 rads 4 hr after MA dose and 210 rads 4 hr after the first RT dose). Three subsequent RT doses of 180 rads were given, for a weekly dose of 1,000 rads. Forty-six patients were evaluated, of whom 41 completed at least three courses of MA, and 36 completed the minimum RT and at least three courses of MA. Complete disappearance of tumor was achieved in 50% of all patients and in 67% of those completing therapy. The combined partial and complete response rate was 89% among those completing therapy. No clear correlation was found between serum MA or total MA dose and toxicity or response, except in a comparison of patients with complete response and those with no response. Toxicity was limited to the nervous system; one third of patients developed mild or moderate peripheral neuropathy and an equal number developed nausea and/or vomiting after po MA administration. Of 36 patients completing therapy, 17 were alive and free of disease at 9-24 mo, 10 were alive with disease, 3 died of cancer, 3 died of other causes, and 3 are of unknown status. Results warrant a Phase III study. (17 Refs)

23. CLINICAL TRIAL OF CORYNEBACTERIUM PARVUM (INTRA-LYMPH-NODE AND INTRAVENOUS) AND RADIATION THERAPY IN THE TREATMENT OF HEAD AND NECK CARCINOMA.

Cheng VS, Suit HD, Wang CC, Raker J, Kaufman S, Rothman K, Walker A, Mcnulty P
Joint Radiation Oncology Center, Univ. Health Center of Pittsburgh, 3601 Fifth Ave., Pittsburgh, PA, 15213
Cancer; 49(2):239-244 1982

Fifty-seven patients with previously untreated squamous cell carcinoma of the head and neck region of all clinical stages were entered a trial to evaluate the effectiveness of Corynebacterium parvum combined with radiation therapy in improving local and survival results. Twenty-nine patients were randomized to receive radiation therapy alone, and 28 patients were randomized to receive radiation therapy combined with C parvum. The C parvum was administered into the tumor-bearing lymph nodes of the neck or into the cervical node region in non-node-positive patients (4 mg/m2) and by intravenous routes (at 2, 2, 4, 4 and 4 mg/M2) at days-10,-7, and-3 before, and at +7 and +14 days after the start of radiation therapy. The study began in July 1975 and was terminated after 2 1/2 yr of patient accession. The statistical analysis showed that those receiving C parvum were not doing better than controls and, in fact, in some subgroups there was concern that they might be doing less well. Pertinently, analysis showed that those receiving C parvum would not experience the 25% point improvement in disease-free survival frequency which had been stipulated in the design of the protocol. (Author abstract) (29 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

24. THE COMPARISON OF TOTAL BODY IRRADIATION VS CHLORAMBUCIL AND PREDNISONE FOR REMISSION INDUCTION OF ACTIVE CHRONIC LYMPHOCYTE LEUKEMIA: AN ECOG STUDY. PART I: TOTAL BODY IRRADIATION - RESPONSE AND TOXICITY.

Rubin P, Bennett JM, Begg C, Bozdech MJ, Silber R
Univ. Rochester Cancer Center, Rochester, NY
Int J Radiat Oncol Biol Phys; 7(12):1623-1632 1981

Total body irradiation (TBI) and chemotherapy (CPT) with chlorambucil (CA) and prednisone (PN) were compared for induction of remission in 52 patients with active chronic lymphocytic leukemia (CLL). Under Plan I 11 patients received 150 rads TBI/course (10 rads, 3 x/wk for 5 wk). Seven of 11 patients completed one course, three patients completed two courses, and one completed three courses. Under Plan II 15 patients received 50 rads/course (5 rads/day, 5 days/wk for 2 wk). Fourteen patients completed one course, 8 patients completed two courses, 2 patients completed three courses, and 1 patient completed five courses. Twenty-six patients received CPT (30 mg CA/square meter po 1 x/2 wk for 18 courses) or 9 mo, plus 80 mg PN for 5 days every 2 wk for 18 courses. No complete remissions (CR) were achieved by TBI; partial remissions were achieved in 73% of Plan I patients and 47% of Plan II patients. Life-threatening depression of granulocytes and/or platelets occurred in 73% of Plan I patients and 43% of Plan II patients. CPT achieved CR in 23% of cases and PR in 54%. CPT thus produced an overall response rate of 77% compared with 58% for TBI. Duration of response was 18 wk for TBI and 45 wk for CPT. Median survival times were not significantly different (136 wk for TBI and 135 wk for CPT). Results indicate that CPT is superior to TBI for improving the response rate, number of patients in remission, and median duration of response. (25 Refs)

25. TREATMENT OF CHRONIC GRANULOCYTIC LEUKEMIA WITH CHEMORADIOTHERAPY AND TRANSPLANTATION OF MARROW FROM IDENTICAL TWINS.

Fefer A, Cheever MA, Greenberg PD, Appelbaum FR, Boyd CN, Bruckner CD, Kaplan HG, Ramberg R, Sanders JE, Storb R, Thomas ED
Div. Oncology, BB1025 Health Sciences, Univ. Washington, Seattle, WA, 98195
N Engl J Med; 306(2):63-68 1982

Treatment of Philadelphia (Ph)-positive chronic granulocytic leukemia (CGL) by supralethal chemoradiotherapy and marrow transplantation from an identical twin is reported. Twelve patients (13-46 yr old) in the chronic phase of CGL and 10 (11-54 yr old) in the terminal phase of CGL received 920-1000 rad of 60 Co total body irradiation in a single exposure. Bone marrow from donor iliac crests was infused in within 24 hr of irradiation. Results for patients in the chronic phase showed hematopoiesis restoration and complete clinical and cytogenic remission with disappearance of all Ph positive metaphases in all 12 patients. Marrow engraftment was detectable histologically by 2 wk after transplantation. The absolute granulocyte count rose to greater than 500 by days 12-33, counts greater than 20,000 without supporting platelet transfusions were common by days 13-32. Side effects and complications included gastrointestinal toxicity, rashes, mild liver function abnormalities, fever (greater than 38 C), viral infections, dry mouth, and amenorrhea. Eight patients remain in complete remission 21-65 mo (median greater than 30 mo) after transplanation. Six terminal phase CGL patients entered complete remission and four died 10-17 days after transplantation. Cytogenic evaluation after transplantation showed no detectable pH positive metaphases in 4 patients (3 ultimately had relapses); 3 still had Ph positive metaphases. Apparently blast crisis is delayed and survival is prolonged by twin-marrow transplantation. (30 Refs)

26. SANCTUARY THERAPY: A RANDOMIZED TRIAL OF 724 CHILDREN WITH PREVIOUSLY UNTREATED ACUTE LYMPHOBLASTIC LEUKEMIA. A REPORT FROM CHILDRENS CANCER STUDY GROUP.

Nesbit ME, Sather H, Robison LL, Donaldson M, Littman P, Ortega JA, Hammond GD
Children's Cancer Study Group Operations Office, 1721 North Griffin Ave., Los Angeles, CA, 90031
Cancer Res; 42(2):674-680 1982

Between 1972 and 1974, Children's Cancer Study Group enrolled 724 children with newly diagnosed acute lymphoblastic leukemia on a single randomized clinical trial. Study CCG-101 was designed to test four types of presymptomatic central nervous system and sanctuary therapies consisting of (a) 2,400-rad craniospinal radiation therapy (RT) plus 1,200-rad extended-field RT, which included the liver, spleen, kidneys, lower abdomen, and gonads; (b) 2,400-rad craniospinal RT; (c) 2,400-rad cranial RT plus intrathecal methotrexate (it MTX); and (d) it MTX alone. Patients all received a 28-day induction course of vincristine, prednisone, and L-asparaginase and were maintained subsequently on a regimen consisting of daily 6-mercaptopurine, weekly MTX, and monthly pulses of vincristine and prednisone. Patients treated with six doses of it MTX alone had a significantly higher incidence of central nervous system relapse than did patients treated with 2,400-rad craniospinal RT plus 1,200-rad abdominal RT, 2,400-rad craniospinal RT, or 2,400-rad cranial RT plus it MTX. There was no significant difference in marrow remission duration or survival of the treatment groups. There appears to be a benefit with regard to length of bone marrow remission and survival for patients with initial white blood counts greater than 20,000/cu mm treated with cranial RT plus it MTX. The majority of the patients remaining on study have now discontinued maintenance therapy. The 8-yr overall estimated survival rate on this study is 56%, and the disease-free survival rate is 52%. (Author abstract) (27 Refs)

27. FREQUENCY OF COMPLICATIONS AND RADIOTHERAPEUTIC PROGRESS IN HODGKIN'S DISEASE.

Abbatucci JS
Centre Francois Baclesse, Route de Lion-sur Mer, 14021 Caen Cedex, France
Sem Hop Paris; 57(41/42):1761-1766 1981

Local and general complications resulting from the radiotherapeutic treatment of Hodgkin's disease (HD) are described. Max dosages tolerated in regions irradiated in the treatment of HD are reported. Complications observed after radiotherapy for HD and non-HD lymphomas (380 regional irradiations) included myelopathy (1), carditis (2), lung disease (4), and thyroiditis (1) after 250 treatments with supradiaphragmatic radiation, intestinal occlusion (2), nephritis (2), and osteitis (4) after 130 treatments with subdiaphragmatic radiation, and cutaneous

sclerosis (13) and growth disorders (2) after 380 treatments with supra- and subdiaphragmatic radiation. Complications arose due to radiation overdose resulting from misunderstanding of timing factors in radiation administration, which modify the biological value of the dose, choice of wrong radiation technic, offsetting of radiation volume, and addition of successive treatments. General complications resulting from irradiation of sensitive tissues and the integral radiation dose include cancer and hematologic and immunologic disorders. The risk of a second primary cancer following radiotherapy for HD is increased by a factor of 18-25. Second primary cancers include squamous cell carcinomas, adenocarcinoma, sarcomas, and acute non-lymphoid leukemias. The increase in the risk of cancer following radiotherapy may result from DNA damage, liberation of a cancerogenic agents, or depression of immunity. Other risks associated with irradiation of the thyroid and gonads are described. (26 Refs) (In FRE)

28. FUNCTIONAL HYPOSPLENA AFTER SPLENIC IRRADIATION FOR HODGKIN'S DISEASE.

Coleman CN, McDougall IR, Dailey MO, Ager P, Bush S, Kaplan HS
Div. Radiation Therapy, Stanford Univ. Medical Center, Stanford, CA, 94305
Ann Intern Med; 96(1):44-47 1982

We previously reported a patient who developed fulminant pneumococcal sepsis 12 yr after successful treatment for Hodgkin's disease, which included splenic irradiation. We have since evaluated splenic size and function in 25 patients who had received splenic irradiation 5 to 16 years previously either for Hodgkin's disease (n = 19) or non-Hodgkin's lymphoma (n = 6). Mean max splenic diameter as measured on a 99mTc-sulfur colloid liver-spleen scan was 6.2 cm in the irradiated group and 9.7 cm in a control group (p less than 0.001). The mean percentage of RBC containing pits when observed with interference phase microscopy was 13.0% in the irradiated group, which was significantly different (p less than 0.001) from the levels found in each of the control groups: normal subjects, 0.9%; unstaged and untreated lymphoma patients, 0.6%; and patients after splenectomy, 33.7%. Patients who have had splenic irradiation should be considered at risk of developing overwhelming pneumococcal sepsis. (Author abstract) (24 Refs)

MUSCULOSKELETAL NEOPLASMS

29. CHORDOMA.

Reddy EK, Mansfield CM, Hartman GV
Coll. Health Sciences, Dept. Radiation Therapy, Univ. Kansas, 39th and Rainbow Blvd., Kansas City, KS, 66103
Int J Radiat Oncol Biol Phys; 7(12):1709-1711 1981

Clinical presentation and management of 10 patients (3 males and 7 females, 14-73 yr old, median 40.5 yr old) with chordoma are reported. Five patients had cranial tumors (in the clivus or parasellar area), one had a lumbar tumor, and four had sacral or sacrococcygeal tumors. Three patients had biopsy as the only surgical procedure; six patients underwent subtotal resection of the tumor mass. Eight patients received radiation therapy (RT: 4,200-8,000 rads in 4-8 wk). Av follow-up was 7 yr, with a minimum of 3 yr. Four patients were alive and disease-free at 3-15 yr; three of these had been treated by surgery and postoperative RT and one had received RT only. Six patients died of disease at 2-13 yr; four of these received RT (2 for tumor recurrence). Death resulted from local disease in five cases and from lung and liver metastases in one case. Treatment by surgery combined with aggressive RT (6,500-7,000 rads in 6-7 wk) is recommended. (16 Refs)

30. LIPOSARCOMA IN ADULTS. PROGNOSTIC FACTORS IN A SERIES OF 84 CASES.

Le Chevalier T, Rouesse J, Contesso G, Pejovic MH, Genin J, Sarrazin D
Institut Gustave Roussy, rue Camille Desmoulins, F 94800 Villejuif, France
Nouv Presse Med; 10(44):3625-3628 1981

A retrospective study of 84 patients with liposarcoma treated at the Gustave Roussy Institute between 1956 and 1978 has elicited a number of factors which influence the prognosis, namely: (1) the site of the initial tumor: patients with liposarcoma of the head, trunk and extremities have a better survival rate than those with retroperitoneal tumors or tumors of the pelvic and pectoral girdles; (2) the histological type: differentiated forms have a brighter prognosis than undifferentiated forms; (3) the size of the tumor: tumors of less than 10 cm in diameter have a more favorable prognosis than larger tumors; and (4) the patient's age, which in fact correlates with the histological type. Local recurrences are common but do not seem to worsen the prognosis. The only curative treatment is surgery, but radiotherapy reduces the risk of local recurrences and chemotherapy may be considered in cases with poor prognosis. (Author abstract) (20 Refs) (In FRE)

31. RADIOTHERAPY OF METASTATIC MELANOMAS.

von Lieven H, Lissner J
Radiologische Klinik der Universitat, Ziemenstr. 1, D-8000 Munchen 2, W. Germany
MMW; 123(50):1941-1944 1981

Applications of radiotherapy (RT) in the treatment of metastatic melanoma (MM) are described based on a retrospective study of 67 patients. MM was histologically confirmed in all patients; no patients had undergone prior surgery or RT. Lymph node metastases were irradiated with Co60 gamma rays. Primary tumors were irradiated with fast electrons. A total dose of 23.5-86.0 Gray was delivered in fractions of 2.5-4.3 Gray. Freedom from recurrence was achieved at a rate dependent on total dose and duration of treatment. Results indicate that the radiosensitivity of MM is less than that of other skin tumors but comparable to that of tumors of other organs. For a total dose of 55.0-70.0 Gray, a weekly dose of 10-12 Gray is recommended. Fourteen patients with Stage I disease received prophylactic RT of regional lymph nodes; and only 2 patients developed regional metastases. No recurrences were found after doses over 1600 rad equivalent therapy. RT produced results at least comparable to those from lymphadenectomy in cases of occult metastases. For cases with manifest lymph node metastases a combination of RT and lymphadenectomy is recommended. Palliative RT of distant metastases achieved relief of symptoms in most cases with a dose of 50 Gray in 5 wk. Side effects of RT included sc fibrosis and radiogenic ulceration. The risk of ulceration was particularly high in the lower extremities of patients with circulatory disorders. Overall results indicate the value of RT in curative or palliative therapy of MM. (21 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

32. THE ROLE OF RADIATION THERAPY IN CARCINOMA OF THE LUNG.

Eisert DR, Hazra TA

Div. Radiation Oncology, Medical Coll. Virginia, Virginia Commonwealth Univ., Richmond, VA, 23298

JAMA; 247(3):338-340 1982

Radiotherapy (RT) in treatment of carcinoma of the lung (CL) is reviewed. RT is recommended for patients with CL limited to the thorax who are not candidates for surgery and who do not have small-cell CL. Complete or partial reduction in tumor mass can be achieved in 60-75% of such cases. Respons e is dependent on total radiation dose. Local control can be achieved in 36, 55, and 62% of cases with 4,000, 5,000, or 6,000 rad, respectively. While continuous-dose RT is more time-consuming than split-dose RT, it produces longer survival with lower risk of recurrence. Preoperative RT can convert some inoperable tumors to the operable state, but survival time is not improved. Postoperative RT improves survival if hilar and/or mediastinal lymph nodes are involved, or if surgical margins are positive for tumor. Postoperative RT does not improve survival of patients with negative lymph nodes. Adjuvant RT has not improved survival with chemotherapy for small-cell CL, but does reduce morbidity. Whole brain irradiation is effective in preventing brain metastases in patients receiving chemotherapy. Palliative RT provides symptomatic relief in a majority of patients with metastatic disease. (13 Refs)

33. RECONSTRUCTIVE OPERATIONS IN SURGICAL AND COMBINED TREATMENT OF LUNG CANCER.

Kharchenko VP, Fomin NS, Galil-Ogly GA, Chikvadze VD, D'iachkova LV, Loginova NA, Vershinin AI, Pokas LV

Surgical Clinic, Res. Roentgenoradiological Inst., Moscow, USSR

Khirurgiia (Mosk); (11):65-69 1981

Of 1,523 lung cancer patients subjected to lung resection, 360 (342 men, 18 women; 50-70 yr old) underwent reconstructive surgery. Histologically, 316 patients had squamous cell carcinoma, 22 had adenocarcinoma, and 22 had poorly differentiated carcinoma; majority of the patients (287) had central lung cancer. Twenty-three patients were in Stage I, 185 were in Stage II, and 152 were in Stage III. Of 360 patients, 71 underwent lobectomy with wedge resection of the major bronchus, 197 underwent lobectomy with circular resection of the major bronchus, 33 underwent lobectomy with circular resection of the major bronchus and resection of the bifurcation of the trachea, and 59 underwent pneumonectomy with resection of the bifurcation of the trachea. Of 360 patients, 265 received surgery in combination with pre- or postoperative radiotherapy (total dose 4,000-4,500 rads) or chemotherapy with cyclophosphamide (total dose 4 g). Postoperative complications were observed in 133 patients (29 died during the postoperative period). The 5-and 10-yr survival rates after surgery alone were 49.7% and 32.4%, respectively, compared with 60.3% and 44.8%, respectively, after surgery in combination with postoperative radiotherapy. Preoperative radiotherapy and chemotherapy did not improve the long-term results of the treatment. (10 Refs) (In RUS)

34. CEREBRAL IRRADIATION AS ADJUVANT THERAPY IN THE TREATMENT OF SMALL-CELL CARCINOMA OF THE LUNG.

N'Guyen TD, Pons A, Armand JP, Combes PF

Service de Radiotherapie, Institut Jean-Godinot, B.O. P.171, F51056 Reims Cedex, France

Rev Fr Mal Respir; 9(5):403-408 1981

The effectiveness of adjuvant cerebral irradiation was studied in 33 patients with small-cell lung cancer. All 33 patients were subjected to sequential polychemotherapy with cyclophosphamide (500 mg/square meter/day iv, days 1 and 8), vincristine (1 mg/m2/day iv, days 1 and 8), procarbazine (100 mg/m2 po, days 1-15) and lomustine (30 mg/m2 po, day 1, every other cycle) in monthly cycles and to mediastinal irradiation (total dose 3,000 rads in 10 fractions in 2 wk) during cycle 4 of the chemotherapy. In addition, 14 nonrandomized patients (Group I) were subjected to adjuvant cerebral irradiation (total dose 3,000 rads in 300-rad fractions in 2 wk) beginning on day 1 of the first polychemotherapy course. The remaining 19 patients who did not receive cerebral irradiations served as controls. All 3 patients were followed up for at least 12 mo. The incidence of (solitary or multiple) cerebral metastases was 0/14 in Group I and 8/19 in the controls. The mean survival times were 11.7 mo in Group I and 12.3 mo in the controls; the difference is not significant statistically. Eighteen patients in the control group died: the cause of death was cerebral metastasis in 7 cases, hepatic metastasis in 4, bone metastasis in 1, and local recurrence in 6. Thirteen patients in Group I died: the cause of death was hepatic metastasis in 4 cases, bone metastasis in 2, local recurrence in 5, and other causes in 3. One patient in each group has been in complete remission on chemotherapy for 10 mo (Group I) and 17 mo (control), respectively. The findings indicated that adjuvant cerebral irradiation is highly effective in preventing cerebral metastases without prolonging the survival because of extracerebral metastases. (Author abstract) (5 Refs) (In FRE)

35. EFFECT OF RADIOTHERAPY ON THE IMMUNOCOMPETENCE IN PATIENTS WITH BRONCHOGENIC CARCINOMA AND LARYNGEAL CANCER.

Oshitani T

Dept. Radiology, Kobe Univ. Sch. Medicine, Kobe, Japan

Nippon Igaku Hoshasen Gakkai Zasshi; 41(9):873-886 1981

We evaluated the immunocompetence of 80 patients with bronchogenic carcinoma and 17 patients with laryngeal cancer undergoing radiotherapy, using collectively many types of immunological parameters. In patients with bronchogenic carcinoma, no significant difference was seen with PHA and PPD skin tests, but the reactivity of PHA skin tests gradually decreased in the course of treatment. It was assumed that radiotherapy might not interfere with the recognition of antigen. Lymphocyte blastoid transformations with PHA, ConA and PWM were all inhibited significantly. Since these three mitogens can stimulate the different groups of lymphocyte, the inhibition to the proliferative function of lymphocyte due to radiotherapy would seem to cover a wide area, including T and B lymphocyte. Concerning the comparative radiosensitivity of T and B lymphocyte, no significant result was obtained. However, in the dose of 20Gy the percentage of T lymphocyte decreased, while the percentage of B lymphocyte increased. The percentage of early rosettes, one subset of T cell, decreased more sensitively than that of T cell, but there was no significant difference. The percentage of IgGFcR(+)T cell, considered a part of cytotoxic T cell or suppressor T cell, decreased

significantly in the dose of 20 Gy, but returned to a high value in the dose of 40Gy. As the helper T cell can be considered radioresistant, it has been suggested that radiotherapy might give the host an immunological enhancement against tumor if a certain suitable method is used. Immunocompetence of cases in Stage III, which was significantly high before treatment, decreased to the same level as those in Stage IV according to the treatment. In patients with laryngeal cancer, lymphocyte counts and reactivity of PHA skin tests were not influenced by radiotherapy, and then reactivity of PPD skin tests and lymphocyte blastoid transformations with PHA and ConA tended to increase instead. Those results seemed to come mainly from the removal of inhibition to the immune system due to tumor, so we hope the estimate of immunocompetence can bring us influential information for judgement of the time of recurrence. (Author abstract) (64 Refs) (In JPN)

36. INTRAPLEURAL INSTILLATION OF RADIOACTIVE CHROMIC PHOSPHATE IN MALIGNANT PLEURAL EFFUSION.

Nori D, Moorthy CR, Hilaris BS, Batata MA, Chu F, Martini N
Brachytherapy Service, Memorial Slon-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
Indian J Cancer; 18(4):288-291 1981

The possible beneficial effects of intrapleural instillation of 32Phosphoruous colloidal suspension in 85 patients with pleural effusion were investigated. Malignant pleural effusion is generally the result of either pleural implantation by small multiple metastases or lymphatic obstruction secondary to mediastinal or lymphangiectasis metastases. Advantages of 32P colloidal suspensions over similar suspensions of radioactive gold include higher beta energy, resulting in a greater tissue penetration, longer half-life, and the absence of gamma radiation. Twenty-seven of the 85 patients treated by 32P colloidal suspensions were complete responders and 24 were partial responders, for a total response rate of 60%. Median duration of response was 3 mo. Best response was achieved in patients with breast primary (67%) while lung had the lowest response rate (42%). Thoracentesis and 32P instillation were tolerated well. Patients who had a good distribution of colloid had a higher response rate (67%-80%) as compared to the few patients who had poor distribution (33% responders). Response was not related to extent of disease, or previous chemotherapy. Patients with serous effusion had a better response rate than patients with serosanguinous or sanguin ous effusion. (4 Refs)

INSTRUMENTATION AND TECHNOLOGY

37. MEASUREMENTS OF THE DOSE DISTRIBUTION IN MANTLE FIELDS.

Jones D, Hilko R
Northwest Center Radiological Physics, Univ. Washington RC-08, Seattle, WA, 98195
Int J Radiat Oncol Biol Phys; 7(12):1733-1735 1981

A reference case consisting of a polystyrene phantom was constructed for calculation of radiation doses in irregular fields. Measurements of dose distributions are given for 13 machines. Variations in results are discussed. The importance of off-axis calculations in mantle irradiation is demonstrated. (2 Refs)

38. IMPROVED CALCULATIONS OF ENERGY DEPOSITION FROM FAST NEUTRONS.

Brenner DJ, Prael RE, Dicello JF, Zaider M
Los Alamos Natl. Lab., Los Alamos, NM
Proceedings of the Symposium on Neutron Dosimetry, held in Munich-Neuherberg, West Germany, June 1, 1981. Available from National Technical Information Service, Springfield, VA, as DE81025385:, 11 pp., 1981.

Increased interest in fast neutrons for radiotherapy has led to a need for accurate measurements and calculations in the energy region up to 100 MeV. Experimental neutron cross sections on elements of biological interest in the region above 15 MeV are sparse. Moreover, until recently, no secondary particle production spectra had been measured in this energy range. New data from the University of California at Davis has allowed cross-sectional calculations to be more firmly based. This in turn results in improved calculations of dose and energy deposition in small sites from high-energy neutrons. Secondary particle production spectra due to neutrons incident on carbon and oxygen are calculated using an intranuclear cascade code which takes into account specific nuclear properties of carbon and oxygen (in particular, alpha-particle clustering). It also allows excited nuclei to deexcite by Fermi breakup rather than the more frequently used statistical evaporation mechanism, which is not applicable to low-mass nuclei. The code yields double-differential secondary particle spectra in energy and angle which show good agreement with the experimental data from the University of California at Davis at 27, 40, and 61 MeV. (Author abstract)

39. CLINICAL HYPERTHERMIA: RESULTS OF A PHASE I TRIAL EMPLOYING HYPERTHERMIA ALONE OR IN COMBINATION WITH EXTERNAL BEAM OR INTERSTITIAL RADIOTHERAPY.

Manning MR, Cetas TC, Miller RC, Oleson JR, Connor WG, Gerner EW
Radiation Oncology Div., Univ. Arizona Health Sciences Center, Tucson, AZ, 85724
Cancer; 49(2):205-216 1982

Forty-three patients with advanced, locally accessible neoplasms were treated in a Phase I clinical trial employing hyperthermia alone or hyperthermia combined with either high-dose-rate external beam or low-dose-rate interstitial radiotherapy (interstitial thermoradiotherapy). All p atients had failed previous conventional therapeutic attempts, including various combinations of surgery, chemotherapy and radiation therapy. A number of tumors with different histologies were treated, including squamous cell carcinoma, adenocarcinoma, melanoma, malignant fibrous histiocytoma, and sarcoma. The response evaluation criteria used included no response (NR- less than 50% decrease in tumor vol), partial response (PR-50% less than or equal to tumor vol reduction less than 100%) and complete response (CR-complete tumor disappearance). For all tumor types, hyperthermia therapy alone resulted in a total response rate of 45% (27% PR, 18% CR). Hyperthermia combined with high-dose-rate external beam radiotherapy yielded a total response rate of 80% (53% PR, 27% CR). Seventeen patients treated with interstitial thermoradiotherapy displayed a 100% total response rate (29% PR, 71% CR). By tumor histologies for all treatment groups, total response rates have ranged from 50 to 79% for all types except melanoma, which has shown a 100% (8/8) response rate to date. Response durations have varied from 1 to 24 mo. Twelve of the 43 patients remain alive; 3 have no evidence of disease (NED) while 9 have either stable local disease or are NED in the treated vol

but have metastatic disease. Complications have been minimal. The results of this Phase I trial demonstrate that hyperthermia alone or combined with radiation can be safely applied in the treatment of malignant disease. Most importantly, the data suggest that hyperthermia, especially when combined with interstitial thermoradiotherapy, can yield remarkable results in the eradication of local cancers. (35 Refs)

PRÉ-CLINICAL STUDIES

40. EFFECT OF COMBINED MISONIDAZOLE AND ACCELERATED NEON IONS ON A HUMAN MELANOMA TRANSPLANTED INTO NUDE MICE.

Guichard M, Tenforde T, Curtis S, Malaise EP
Institut de Radiobiologie Clinique, Institut Gustave-Roussy, 16 bis, Avenue Paul-Vaillant Couturier, 94800 villejuif, France
Radiology; 142(1):219-223 1982

The response to accelerated neon ions of human Nall melanomas growing in nude mice was measured by an in vitro colony-forming assay following in situ tumor irradiation in the midposition of a 10-cm extended-peak ionization region. Values of the relative biological effectiveness (RBE) for peak neon ions compared with 60Co gamma radiation were 3.2 and 3.4, respectively, at the 1% and 10% survival levels. Following irradiation with peak neon ions, the repair of potentially lethal damage (PLD) was comparable to that observed after gamma irradiation. When misonidazole (1 mg/g intraperitoneal dose) was administered in combination with extended-peak neon ions, the drug enhancement ratio (ER) at the 1% survival level was 1.5 if the tumors were removed and plated in vitro immediately following irradiation, and 1.9 if tumor excision and plating were delayed for greater than or equal to 6 hr. Administration of misonidazole completely inhibited PLD repair following either gamma irradiation or extended peak neon-ion irradiation. (Author abstract) (18 Refs)

41. FRACTION SIZE AND THE REPAIR OF POTENTIALLY LETHAL RADIATION DAMAGE IN A HUMAN MELANOMA CELL LINE. POSSIBLE IMPLICATIONS FOR RADIOTHERAPY.

Weichselbaum RR, Malcolm AW, Little JB
Joint Center for Radiation Therapy, Peter Bent Brigham Hosp., 721 Huntington Ave., Boston, MA, 02115
Radiology; 142(1):225-227 1982

Studies performed on a human melanoma line in exponential growth showed radiation survival parameters similar to those of other tumors (n = 1.2, D0 = 151). In plateau-phase cultures, however, this tumor cell line was efficient in the repair of potentially lethal radiation damage, especially when large dose fractions were employed (there was a 48-fold recovery after 1,200 rad [12 Gy]). Thus, extrapolation from survival data generated only on exponentially growing cells may be misleading when determining the ultimate surviving fraction in some tumors. Large-fraction radiotherapy may not be effective in tumors that contain cells analogous to plateau-phase cells. (Author abstract) (15 Refs)

42. RADIOSENSITIZING EFFECT OF HYPERTHERMIA ON MOUSE SQUAMOUS CELL CARCINOMA.

Yoshino T
Dept. Obstetrics and Gynecology, Faculty Medicine, Kyushu Univ., Kyushu, Japan
Fukuoka Igaku Zasshi; 72(10):521-531 1981

Therapeutic effects of hyperthermia were investigated in tumor-bearing female DDD strain mice (6-8 wk old) prior to and after irradiation. Mice were administered 20-methylcholanthrene by the string method to induce squamous cell carcinoma of the uterine cervix (MCUCa1); MCUCa1 cells were inoculated into thighs of mice of the same species and then transplanted. The transplanted tumors were irradiated with single 2,000 rad doses. Only the legs with the tumors were given 43 C hyperthermia treatment for 30 min using a circulater type precision thermostatic water bath. The mice were divided into eight groups, based on the time of hyperthermia treatment (6, 4, 2, or 1 hr before or 1, 2, 4, or 6 hr after irradiation). Following irradiation, tumors were measured 3x/wk; the degree of reaction was scored according to Denekamp's system (7 stages, scored from 0.5 to 3.5). Based on calculations of therapeutic gain, hyperthermia administered immediately before or after irradiation had no effect on therapy (therapeutic gain 0.80-0.88), but hyperthermia administered 4-6 hr before or after irradiation was effective (therapeutic gain 1.00-1.12). (43 Refs)

43. RESPONSE OF HUMAN MALIGNANT MELANOMA XENOGRAFTS TO HYPERTHERMIA: EFFECT OF VASCULAR OCCLUSION.

Rofstad EK, Brustad T
Norsk Hydro's Inst. Cancer Res., Norwegian Radium Hosp., Montebello, Oslo 3, Norway
Int J Radiat Oncol Biol Phys; 7(12):1685-1687 1981

Single-cell survival of human malignant melanoma (MM) xenografts after hyperthermic treatment under normal and hypoxic conditions was assayed. E.E. MM (EE) cells were obtained from an axillary lymph node metastasis in a 62-yr-old man. V.N. melanoma (VN) cells were obtained from an sc metastasis in a 29-yr-old woman. NMRI/nu/nu/Han mice (males and females) received flank transplants of tumor from passages 30-35 of EE or passages 20-25 of VN melanoma. Treatments were performed when tumors reached a diameter of 8-12 mm. Tumors were exposed to hyperthermia (42.5 C) by immersion in a water bath for varying times. Blood supply to some tumors was occluded by application of a tourniquet 15 min before immersion. Hyperthermia reduced the colony-forming capacity of MM cells on soft agar. VN cells were more sensitive than EE cells. Heat sensitivity of both cell types was greatly increased by occlusion of the tumor blood supply before treatment. Temperatures of clamped and nonclamped tumors were the same, indicating that reduced cell survival in clamped tumors was not due to higher temperatures. Slope (D0) values were calculated for exponential plots of cell survival versus time. The ratios of D0 for unclamped tumors to D0 for clamped tumors were 6.6 +-3.6 for EE cells and 2.3 +-0.5 for VN cells. (19 Refs)

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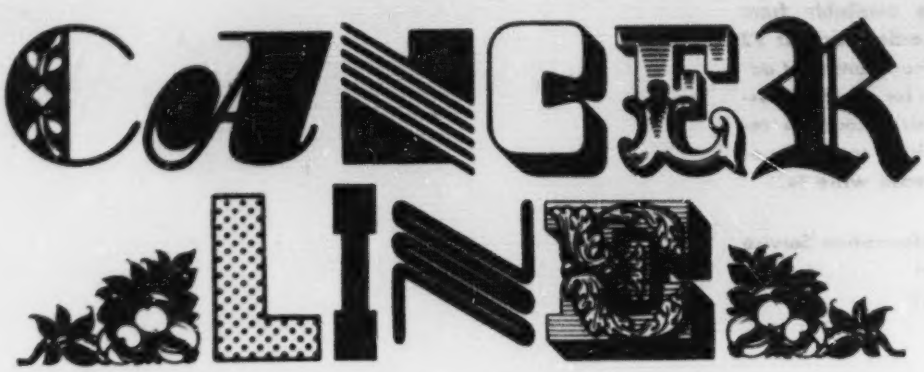

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Radiation Therapy

SERIES CT15 No. 82/07 JULY, 1982

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BREAST NEOPLASMS

1. THE IMPORTANCE OF POSTOPERATIVE RADIOTHERAPY FOR THE REDUCTION OF THE LOCAL RECURRENCE RATE OF MASTOCARCINOMAS.

Berg-Schlosser V, Zimmermann U, Prignitz R, Kleinsorge F, Hess F
Klinik und Poliklinik für Strahlentherapie und Rontgendiagnostik, Robert-Koch-Str. 8a, D-3550 Marburg/Lahn, W. Germany
Strahlentherapie; 157(11):705-712 1981

In order to find out the frequency of local recurrences, the authors evaluated 4 33 case reports of patients with mastocarcinomas who had been submitted to postoperative radiotherapy on a gammatron between January 1973 and December 1977 at the Radiologic Hospital of the University of Marburg. A local recurrence within the region of thoracic wall, axilla or supraclavicular cavity was found in 24 cases (5.5%). For half of these cases, a formation of remote metastases was clinically demonstrable either at the same time as the local recurrence was found or a few mo before or afterwards. In 63% of all cases, the local recurrence appeared within the first 2 yr after operation and irradiation. The study contains a comparative table of the local recurrences found in 20 examinations. These patients were either not irradiated or submitted to postoperative radiotherapy under high voltage conditions. The rate of local recurrences of the only operated groups was 22.2% on an av, that of the groups of patients irradiated after surgery was 6.4%. (Author abstract) (39 Refs) (In GER)

2. PRIMARY RADIATION THERAPY OF BREAST CANCER.

Sauer R
Strahlentherapeutische Universitatsklinik, Krankenhausstrasse 12, D-8520 Erlangen, W. Germany
Strahlentherapie; 157(2):71-80 1981

Many experiences with breast-saving primary radiation therapy following tumorectomy justify the utilization of this method as an alternative to mastectomy. Complications are insignificant, cosmetic results excellent in general, on the condition, however, of rigorous indication, of careful and atraumatic surgical technique and exactly planned and accurately delivered megavoltage therapy. Local and regional tumor control amounts to 90% in Stage-I cases, to 85% in Stage II, and to about 65% in Stage III. Five-yr survival is obtained in 85 to 95% of Stage I cases, 65 to 75% of Stage II and in about 25% of Stage III cases. Ten-yr survival rate lies between 45 and 60%. No sign of secondary malignomas possibly induced by curative radiation therapy has been found till now. (Author abstract) (60 Refs) (In GER)

3. STAGE III AND LOCALIZED STAGE IV BREAST CANCER: IRRADIATION ALONE VS IRRADIATION PLUS SURGERY.

Bedwinek J, Rao DV, Perez C, Lee J, Fineberg B
Div. Radiation Oncology, Mallinckrodt Inst. Radiology, Washington Univ., 4511 Forest Park, St. Louis, MO
Int J Radiat Oncol Biol Phys; 8(1):31-36 1982

One hundred and eighty-three patients with Stage III and localized Stage IV breast cancer were treated with radiotherapy alone (RT) or RT combined with surgery (RTS). Of the 147 patients with non-inflammatory carcinoma (NIC), 93 received RTS, and 54 RT. Of 36 patients with inflammatory carcinoma (IC), 29 were treated with RT, and the remaining 7 with RTS. In NIC patients, a significantly higher rate of local failure occurred in RT patients (61%) as compared with RTS (13%) patients. The regional failure rate was 37% in RT patients and 12% in RTS patients. The incidence of distant metastasis was the same for both groups, 65% vs 68%. The local failure rates were 45% for RT patients and 12% for RTS patients in the T3 NIC category, and 65% for RT patients and 13% for RTS patients in the T4 category. In both categories, the incidences of distant metastasis were essentially the same. Local failure rates were determined in relation to tumor size and treatment: 5-8 cm: 43% for RT, 14% for RTS; and 8 cm or greater: 76% for RT, 5% for RTS. There was no difference in the distant metastasis rates between the two treatment groups within the 5-8 cm and 8 cm or greater categories. The rate of local failure for the 29 patients with IC treated with RT was 52% compared to 14% for those treated with RTS. The difference in the regional failure rate between RT (38%) and RTS (29%) was determined. The rate of distant metastasis was essentially the same for the two treatment groups. With the exception of the six patients with tumors 0-5 cm, the incidence of local failure did not decrease with increasing total tumor dose. The most frequent complication, either moderate or severe, in the RT group was breast fibrosis (19%), while in the RTS group, arm edema (13%) was the most common complication. (20 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

4. THERAPEUTIC RESULTS ACHIEVED DURING THE PAST FIFTEEN YEARS IN CASES OF MEDULLOBLASTOMA.

Pichler E, Kogelnik HD, Reinartz G, Karcher KH, Zaunbauer F, Jurgenssen OA, Koos W, Kundi M
Universitats-Kinderklinik, Wahringer Gurtel 74-76, A-1097 Wien, Austria
Strahlentherapie; 157(8):508-515 1981

From October 1964 to December 1979 86 patients with medulloblastoma were craniotomized. Since 1967 38 patients had postoperative radiotherapy, and since 1975 14 patients had additional primary chemotherapy. The quality of radiotherapy was analyzed in a retrograde fashion according to radiation quality, extension of radiation field and radiation dosage. Thus, 11 patients were irradiated in an inadequate, 14 in a suboptimal and 13 in an adequate way. Thirty-seven of 40 patients (2 were lost from observation) who had surgery only died, 1 is alive and free of tumor 14 yr after diagnosis. All 11 patients whose radiotherapy was considered as inadequate (including 1 patient who had cytostatic therapy when in her 3rd relapse) and 12 of 14 patients with suboptimal radiotherapy (including 2 with primary chemotherapy) died. Two patients with suboptimal radiotherapy have survived their diagnosis free of tumor for 9 1/2 and 8 3/4 yr respectively. Two of the 13 patients who had adequate radiotherapy and primary chemotherapy died, 11 (10 of them also treated with primary chemotherapy) have survived for 12 to 66 mo. Two of these 11 patients experienced a relapse recently. These and three additional patients are still on therapy. Adequate radiotherapy of the craniospinal axis plus additional primary chemotherapy seem to bring better chances of survival in this small series thus treated. (Author abstract) (63 Refs) (In GER)

5. CLINICAL EXPERIENCES WITH THE RADIOSENSITIZER MISONIDAZOL.

Bamberg M, Tamulevicius P, Streffer C, Scherer E
Strahlenklinik, Universitatsklinikums Essen, Hufelandstr. 55, D-4300 Essen 1, W. Germany
Strahlentherapie; 157(8):524-536 1981

The principle of action of sensitizers with electron affinity is explained and the development of these radiosensitizing substances up to the clinical use of Misonidazol (MIS; Ro-07-0582) is shown. With special regard to the pharmacokinetic action of this substance, the therapeutic effects of MIS were examined in 10 patients with brain tumors of high malignancy (400 mg/m2) and 4 patients with esophageal carcinomas (1 g/m2), all these patients having reached the clinical Phase III. Four other patients with recurrent brain tumors received a dose of 1 g/m2 of MIS before each irradiation. Apart from slight neurotoxic and gastrointestinal side effects, the applied doses of MIS were generally well tolerated. Only in one case a generalized maculopapular exanthema developed which regressed completely within a few days. No correlation could be found between the subjective side effects and the plasma values determined by means of high pressure liquid chromatography (HPLC). After 1 to 4 hr following oral application, the maximum plasma concentrations were measured, the half-life (T1/2) varying in all patients between 5 and 10 hr. It was not possible to demonstrate an influence of dexamethasone on the plasma concentration of half-life of MIS in the brain tumor patients. The cerebrospinal fluid concentrations of MIS which may be used as an index for the concentrations in brain tumors, are closely corresponding plasma values. There was no correlation between MIS concentrations in plasma and saliva, so that the determination of MIS in the saliva cannot be recommended as a routine method for control examinations. Apart from the unchanged MIS, Demethylmisonidazol (DEMIS; Ro-05-9963), the product of demethylation, could be identified as the principal metabolite in urine. Only up to 40% of the MIS doses administered was found in form of MIS or DEMIS. The first preliminary results of the study on brain tumors (108 patients) do not seem to show any therapeutic advantage for glioma patients as against those patients who received only placebos. (Author abstract) (56 Refs) (In GER)

6. A COMPARATIVE STUDY OF EPENDYMOMAS BY SITE OF ORIGIN.

Marks JE, Adler SJ
Div. Radiation Oncology, Mallinckrodt Inst. Radiology, Washington Univ. Sch. Medicine, St. Louis, MO, 63110
Int J Radiat Oncol Biol Phys; 8(1):37-43 1982

The clinical behavior of irradiated ependymomas (EP) arising from different site s (20 supratentorial, 26 infratentorial, 7 spinal cord, and 8 equina cauda) was examined in 61 patients (34 males, 27 females; 25 adults, 36 children) in relation to EP control, clinical and pathologic incidence of spinal seeding, site of failure, dose response, survival, and neurologic function after treatment with surgery and radiation. Persistent or locally recurrent EP at the primary site of EP origin was diagnosed by reoperation in 10 patients, by autopsy in 7, and by clinical deterioration and/or radiographic study in 17. Ventricular spread outside of the irradiated vol was found by autopsy in two patients and by radiography in two. Spinal cord metastases were diagnosed by laminectomy in one patient, cerebral spinal fluid cytology in one, and autopsy in three. The interval from end of radiation until discovery of persistent or recurrent EP was 50 mo for infratentorial, 24 mo for supratentorial, and 17 for spinal cord or cauda equina EP. For 61 patients followed for 3 or more yr, control of primary EP was best for cauda equina, intermediate for spinal cord and infratentorial, and least for supratentorial EP. Spinal metastases occurred in patients with supratentorial (1) or infratentorial (4) EP. The relationship between nominal standard dose, primary tumor control, and failure by site of EP origin is described. Five- and 10-yr survival rates were highest for cauda equina, intermediate for infratentorial and spinal cord, and least for supratentorial EP. Radiation myelopathy and/or cauda equina syndrome developed 3.5-17 yr after treatment with intrathecal gold in 3/8 patients and 1.5 yr after external spinal irradiation in 1/25. Major surgical complications occurred in two patients. Neurologic deficits, retreatment results, second primary tumors, and causes of death are described. (24 Refs)

DIGESTIVE NEOPLASMS

7. SURGICAL TREATMENT OF RECTAL CARCINOMA WITH OR WITHOUT PREOPERATIVE IRRADIATION: PRELIMINARY RESULTS OF A RANDOM TRIAL.

Boulis Wassif S, Lagenhorst BL
Rotterdamsch Radio-Therapeutisch Institut, Rotterdam, The Netherlands
Ned Tijdschr Geneeskd; 125(29):1148-1151 1981

Ninety patients with marginally resectable rectal carcinomas were subjected to surgery (46 patients, Group I) or to preoperative irradiation (av total dose 3,450 rads in 15 fractions, administered in 18 days, 44 patients, Group II). Radical abdominoperineal resection was performed in 30 patients in Group I and 25 in Group II, radical anterior resection in 6 and 15, incomplete resection in 3 patients in Group I, palliative resection because of hepatic metastasis in 1 patient in each group, colostomy because of inoperability or hepatic metastasis in 3 patients in Group I and in 2 in Group II. The postoperative mortality was 7/46 in Group I and 2/44 in Group II. Staging according to Duke's classification was per formed after surgery in 45 patients in Group I and in 42 in Group II. Stage 0 was established in 0 and 1 patient; Stage A in 3 and 6, B in 23 and 26, and C in 19 and 9, respectively. Lymph node metastases were found in 42% of the patients in Group I and in 21% in Group II, which indicates the possibility to sterilize lymph node metastases by preopertive irradiation. Seventy-two patients survived after radical surgery: 8 of them (5 in Group I and 3 in II) developed recurrences during the follow-up period. The prognosis was more favorable in Group II than in I, but the survival rates during the first 5 yr showed no significant differences between the two groups. The survival rates were significantly higher in Stages A + B than in C. (7 Refs) (In DUT)

8. COMBINED PRE AND POSTOPERATIVE RADIATION FOR CARCINOMA OF THE RECTUM.

Mohiuddin M, Kramer S, Marks G, Dobelbower RR
Dept. Radiation Therapy and Nuclear Medicine, Thomas Jefferson Univ. Hosp., Philadelphia, PA, 19107
Int J Radiat Oncol Biol Phys; 8(1):133-136 1982

Seventy-eight patients with invasive carcinoma of the rectum localized to the pelvis received preoperative radiation (500 rad) on the day preceding or the day of surgery. Fifty-six patients underwent an abdominal perineal resection, 10 a combined abdominal transsacral resection, and 4 a low anterior resection; eight patients were treated palliatively. Twenty-nine Stage A or B1 patients received no postoperative treatment. Of

forty-one patients with Stage B2, C1, or C2 disease, 25 received the full course of postoperative radiotherapy. Sixteen patients did not receive postoperative radiation due to surgeon non-compliance with the study (9 patients), patient refusal (5), or postoperative complications (2). Follow-up ranged from 6-48 mo with a median of 18 mo. No complications from low dose preoperative radiation were observed. Mild diarrhea, which usually resolved spontaneously within 1 mo treatment, was the most common problem during the course of postoperative radiation. Five patients had a delay in healing of the surgical wound. One patient developed small bowel obstruction requiring surgery. Two patients died of postoperative complications within 1 mo of surgery. Sixty-nine patients are alive. Of 25 patients receiving both pre- and postoperative radiation, 4 patients developed distant metastatic disease. No patient in this group has failed with recurrent tumor in the pelvis. Of the 16 patients who should have but did not receive postoperative radiation, 6 patients developed recurrent cancer, 4 in the pelvis and 2 with distant metastases. The role of adjuvant radiotherapy is discussed. (14 Refs)

9. RADIOTHERAPY OF CARCINOMAS OF THE BILE DUCTS AND PANCREAS.

Leer JW, Van de Velde CJ, Vierhout PA
Afdelirgen Klinische Oncologie, Academisch Ziekenhuis, Leiden, The Netherlands
Ned Tijdschr Geneeskd; 125(29):1160-1165 1981

Experience with the radiotherapy of patients with carcinomas of the bile ducts or pancreas is reported, and the related literature is reviewed. Six patients with bile duct carcinomas were subjected to choledochotomy, and two of them also to cholecystectomy. Surgery was followed by irradiation of the primary tumor site (total dose 6,000 rads in 6 wk). The regional lymph node were not irradiated. The radiotherapy was well tolerated. Four of the six patients were symptom-free after treatment for approx 6 mo. All patients developed regional recurrences which were the direct or indirect cause of death beyond the first 1-6 mo. Eleven patients with pancreatic carcinoma were irradiated. Irradiation was the only treatment in four patients with nonresectable tumors. The irradiation was combined with chemotherapy (lomustine, vincristine and 5-fluorouracil). Ten of the 11 patients showed subjective improvement. Two patients were still alive 12 and 18 mo after the beginning of the radiotherapy, respectively. The findings and data in the literature indicate that carcinomas of the bile ducts and pancreas should not be considered to be a priori radioresistant tumors. (40 Refs) (In DUT)

GENITOURINARY NEOPLASMS

10. 4,000 RAD PREOPERATIVE IRRADIATION FOLLOWED BY PROMPT RADICAL CYSTECTOMY FOR INVASIVE BLADDER CARCINOMA: A PROSPECTIVE STUDY OF PATIENT TOLERANCE AND PATHOLOGIC DOWNSTAGING.

Shipley WU, Cummings KB, Coombs LJ, Hawkins IR, Einstein AB, Penick G
Dept. Radiation Medicine, Massachusetts General Hosp., Boston, MA, 02114
J Urol; 127(1):48-51 1982

The initial National Bladder Cancer Collaborative Group A experience with 4,000 rad adjuvant preoperative radiation therapy followed promptly (within 1 to 28 days) by radical cystectomy and urinary diversion in patients with muscle-invading bladder cancer was monitored prospectively with respect to tolerance of radiation therapy, early postoperative complications and pathologic downstaging. All patients completed the scheduled megavoltage irradiation with, at most, only mild intestinal, urinary or hematologic toxicity. In addition, 86 per cent of the patients completed planned radical cystectomy, with a median interval between radiation therapy and surgery of 13.6 days. No patient died postoperatively. Of the patients 69 percent recovered with no postoperative complications, while 18 percent had 1,9 percent had 2 and 4 percent had 3 complications. Pathologic downstaging occurred in 39 percent of the patients: the disease was downstaged to stage pT0 in 24 percent and to stage pT1 in 15 percent. Of the patients with an interval of 13 days or less between radiation therapy and surgery the disease was downstaged to stage pT0 in 20 percent and 63 percent had no postoperative complications. In patients with an interval of more than 13 days, the disease was downstaged in 30 percent and 76 percent had no postoperative complications. The results support our rationale for selecting this regimen of adjuvant full dose preoperative radiation therapy, which can shorten the interval between diagnosis and cystectomy while allowing for the possibility of pathologic downstaging and a radiation dose that is likely to sterilize unresected pelvic micrometastases. (Author abstract) (11 Refs)

11. PREOPERATIVE IRRADIATION AND CYSTECTOMY FOR BLADDER CANCER.

Smith JA, Batata M, Grabstald H, Sogani PC, Herr H, Whitmore WF (c/o Batata) Urologic Service, Memorial Sloan-Kettering Cancer Center, New York, NY, 10021
Cancer; 49(5):869-873 1982

Between 1971 and 1974, 101 patients at Memorial Sloan-Kettering Cancer Center underwent planned integrated treatment for bladder cancer with 2,000 rads by megavoltage delivered to the whole pelvis over 5 consecutive days followed by radical cystectomy within a wk. The overall 5-yr survival rate was 39%; the hospital mortality rate was 2%. In the pelvis alone tumor recurred in 9% of the patients. These results support other studies demonstrating the efficacy of this and other regimens of preoperative irradiation and cystectomy. (Author abstract) (9 Refs)

12. STAGE T1NXM0 BLADDER CANCER TREATED BY RADIUM IMPLANTATION OR TRANSURETHRAL RESECTION.

van der Werf-Messing B, Hop WC
Rotterdamsch Radio-Therapeutisch Instituut, Rotterdam, The Netherlands
Ned Tijdschr Geneeskd; 125(21):825-829 1981

The therapeutic effectiveness of exclusive transurethral resection (TUR) and suprapubic radium implantation (RI) following diagnostic TUR was compared in patients with Stage T1NxM0 carcinoma of the urinary bladder. One hundred and forty-eight patients (126 men and 22 women) were subjected to TUR only (TUR Group). Papillary carcinoma was diagnosed in 104/148 patients, solid or mixed carcinoma in 28, and the histological type was not established in 16 cases. Other 197 patients (164 men and 33 women) were treated by radium implantation after diagnostic TUR (RI Group). Papillary carcinoma was diagnosed in 116/197 patients, solid or mixed carcinoma in 75, and the histological type was not ascertained in 6 cases. The actuarial 5-and 10-yr survival rates were significantly

higher in the RI Group (107/195 and 44/195 evaluable patients, respectively) than in the TUR group (55/144 and 8/144 evaluable patients). Local recurrences were seen in 107/143 evaluable patients in the TUR Group and in 35/196 evaluable patients in the RI Group; the recurrences were multiple in 26/107 and 3/35 patients, respectively. Stages higher than T1 were established after recurrence in 32/107 and 6/35 patients, respectively. The patients with recurrences were treated by TUR in 56/107 cases in the TUR Group and in 11/35 cases in the RI Group, while external irradiation was perform ed in 14/107 and 8/35 patients, respectively. Cystectomy was necessary in 8/107 and 5/35 patients, respectively. The findings indicate the definite advantage of radium implantation over TUR in the treatment of patients with solitary bladder carcinoma. (10 Refs) (In DUT)

13. RADIOTHERAPY OF PROSTATE CARCINOMAS.

Dietz R, Dhom G, Kopper B, Sommer F
Radiologische Klinik der Universitat Homburg, D-6650 Homburg, W. Germany
Strahlentherapie; 157(7):442-445 1981

A report is given on 79 patients with primarily untreated 'virginal' prostate carcinomas of the stages T0 to T3, who were submitted to a primary local monotherapy in form of moving field irradiations with megavoltage units between 1971 and 1975. The axial dose was 7,600 rad for the mostly applied method with a telecobalt unit. The prostate had to be surrounded by the isodose of 90%, so it was exposed to at least 6,800 rad. The local effect was examined by control biopsies which were executed at intervals of a 1/2 year to 1 year. More than half of all patients showed a significant regression. The side effects of the high voltage therapy were temporary and could in all cases be controlled by symptomatic treatment. The uncorrected 5-year survival rate was 78.5% for the stages T0 to T3, 90.9% for the stages T1 and T2 and 66.7% for the stage T3. Besides the stage, the prognosis depended also on the degree of differentiation of the tumor. The 5-year survival rate of GIII carcinomas was significantly worse than that of the degrees of differentiation GI and GII. The value of exploratory pelvic lymphadenectomy for the staging before radiotherapy and the individual adaption to the therapy of the degree of differentiation of the tumor are discussed. (Author abstract) (23 Refs) (In GER)

14. RADIATION THERAPY FOR CARCINOMA OF THE PROSTATE.

Kawai T, Takeda T, Kihara K, Fukushima S
Dept. Urology, Cancer Inst. Hosp., 1-37-1, Kamiikebukuro, Toshima-ku, Tokyo, Japan
Prostate; (Suppl1):35-40 1981

Linear accelerator x-rays of 4.3-12 million electron volts were applied through a 240 degree arc moving external beam over different periods of time to 67 patients with prostatic cancer in the following stages: A, 2; B, 13; C, 32; and D, 20. Total tumor doses measured at the center of the prostate were 6,000-7,000 rad within 6-7 wk. Most of the patients also received antiandrogenic treatment; many received chemotherapy; only six underwent radiotherapy (RT) alone. Five-yr survival rates by stage were as follows: A, 100%; B, 91.7%, C, 58.9%; and D, 25.3%. Six patients have survived more than 10 yr, and have discontinued treatment (A, 1; C, 4; D, 1). Radiation effects on 58 patients included reduction in tumor size and prostate softening in 72.4% of cases, no change in 25.9%, and aggravation in 1.7% (1 case). Antiandrogenic therapy is indicated for well-differentiated carcinoma that is responsive to hormone therapy, but RT is indicated for radiosensitive undifferentiated carcinoma. Evaluation of RT based on palpation and biopsy shows that those patients with prostatic atrophy and no cancer cells have an excellent prognosis; where there is no change in size of the lesion after RT, the prognosis is not good, and possible disease reactivation and metastasis should be considered. (5 Refs)

15. EXTERNAL BEAM RADIOTHERAPY FOR PALLIATION OF PAIN FROM METASTATIC CARCINOMA OF THE PROSTATE.

Benson RC, Hasan SM, Jones AG, Schlise S
Dept. Urology, Mayo Clinic, Rochester, MN, 55905
J Urol; 127(1):69-71 1982

Radiotherapy often is used for palliation of bone pain from metastatic cancer of the prostate, but an objective evaluation of its efficacy in a large series of patients is unavailable. We report the results of external beam irradiation in 62 patients who had bone pain secondary to stage D carcinoma of the prostate. The variables used to judge pain before and after radiotherapy included subjective evaluation of pain, status of activity and quantitation of analgesic use. Complete relief of pain was achieved in 26 patients (42%), partial relief in 22 (35%), and no relief in 14 (23%). On the basis of our experience, external beam irradiation is useful palliative therapy for pain from metastatic cancer of the prostate. (Author abstract) (7 Refs)

16. RADIOTHERAPY IN CASE OF INTRACEREBRAL FORMATION OF METASTASES OF NON-SEMINOMATOUS TESTICLE TUMORS.

Budach V, Schulz U, Higi M, Niederle N
Strahlenklinik des Universitatsklinikums Essen, Hufelandstr. 55, D-4300 Essen I, W. Germany
Strahlentherapie; 157(7):450-454 1981

The subject of this study was non-seminomatous testicle tumors with cerebral formation of metastases. Despite the relatively low radiosensitivity of the primary tumors and their regional metastases 18 of 20 patients were free of symptoms, and a complete regression of the intracerebral tumors was shown by computed tomography and/or scintigraphy in 10 of 20 cases. This regression was obtained within 2 or 3 wk by an irradiation of the skull with a focal dose of 30 to 40 Gy. Due to the small number of patients (20), it was not possible to demonstrate a statistically different receptiveness of the cerebral metastases according to their histological subentity. Because of the subjective stress, the duration of radiotherapy should be as short as possible (eg 30 Gy in 10 fractions over a period of 2 wk). In our opinion, irradiation is clearly indicated in case of testicle teratomas with cerebral formation of metastases. Practically the only contra-indications are a strong intracranial hypertension as well as hyperkinesia. The entire prognosis of the patient, however, is not determined by the cerebral formation of metastases but by the pulmonary m etastatic extension, so that radiotherapy is an important palliative factor with regard to the survival time of these patients. (Author abstract) (18 Refs) (In GER)

GYNECOLOGIC NEOPLASMS

17. HIGH VERSUS LOW DOSE-RATE INTRACAVITARY RADIOTHERAPY IN THE TREATMENT OF CARCINOMA OF THE UTERUS. A COMPARATIVE STUDY OF AFTERLOADING CO60 (CATHETRON) AND CONVENTIONAL (RADIUM) TREATMENT.

Taina E
Dept. Obstetrics and Gynecology, Univ. Turku, Turku, Finland
Acta Obstet Gynecol Scand [Suppl]; (103):7-27 1981

Afterloading Co60 and conventional radium therapy of carcinoma of the uterus are reviewed, and a comparative study of the two methods is presented. Intracavitary radium therapy of cervical carcinoma is performed by two principle methods. The Paris method uses small amounts of radium over a long period of treatment for a total dose to the paracervical triangle of 72 Gray. The Stockholm method uses larger amounts of radium in a short, intense treatment, for a dose to the cervix, lower uterine segment, vaginal vault, and paracervical triangle of approx 70 Gray. Cancer of the endometrium is treated by the single linear radium source method, Heyman's packing technique, or intracavitary vaginal radium therapy. Afterloading Co60 (Cathetron) therapy employs various catheters into which Co60 is inserted. The appropriate catheters are inserted into the vagina and uterus and are fixed in place using vaginal prostheses. Afterloading therapy and conventional radium therapy were compared in a study of 101 patients with cervical carcinoma and 91 patients with endometrial carcinoma. Conventional therapy had the advantages of long half life, longest clinical experience, and availability of radium sources. Radiation exposure posed a hazard to patients and staff. Cathetron therapy had the advantages of convenience, radiation protection to the staff and other patients, minimization of hospitalization, good fixation of treatment catheters, and the ability to treat many patients per day. (111 Refs)

18. UROLOGICAL COMPLICATIONS OF RADIOTHERAPY OF UTERINE CARCINOMA.

Bronz L, Kunz J, Schreiner WE
Departement fur Frauenheilkunde, Universitatsspital, CH-8091 Zurich, Switzerland
Gynaekol Rundsch; 21(Suppl3):47-48 1981

Urological complications resulting from radiotherapy (RT) were studied in 839 patients with uterine carcinoma. RT produced transitory complications (TC) in 4% of patients with carcinoma of the collum treated with x-ray/radium RT (XR) and 10% of those treated with high-voltage/cesium RT (HVC); persistent complications (PC) occurred in 5% with XR and 15% with HVC. Among patients with carcinoma of the uterine body, TC occurred in 3% with XR and 7% with HVC; PC occurred in 3% with XR and 8% with HVC. (no Refs) (In GER)

19. INTESTINAL COMPLICATIONS OF RADIOTHERAPY OF UTERINE CARCINOMA.

Bronz L, Kunz J, Schreiner WE
Departement fur Frauenheilkunde, Universitatsspital, CH-8091 Zurich, Switzerland
Gynaekol Rundsch; 21(Suppl3):49-50 1981

Intestinal complications (IC) resulting from radiotherapy (RT) were studied in 839 patients treated for uterine carcinoma (UC). X-ray/radium RT (XR) produced transitory IC (TIC) in 19% of patients with UC of the collum (UCC) and 10% of those with UC of the body (UCB). XR produced persistent IC (PIC) in 12% of patients with UCC and 6% of those with UCB. High-voltage/cesium RT (HVC) produced TIC in 48% of patients with UCC and 36% of those with UCB. HVC produced PIC in 36% of patients with UCC and 15% of those with UCB. (no Refs) (In GER)

20. INTRACAVITARY IRRADIATION OF ENDOMETRIAL CARCINOMAS OF THE UTERUS IN STAGE I USING A 'BULB TECHNIQUE': PHYSICAL BASIS.

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Br J Radiol; 55(649):56-59 1982

In an attempt to replace the well-known low dose-rate 226Ra in the Heyman packing method with a high-dose-rate afterloading system (Cathetron with 60Co sources) for the treatment of stage I carcinoma of the uterine body, a new concept called the 'bulb technique' has been developed. Different 60Co source trains have been combined to create isodose curve distributions adjusted to the individual size and form of the uterine body. Computer simulation and measurements were used to establish the physical basis of the technique. (Author abstract) (8 Refs)

21. A COMPARISON OF CLINICAL RESULTS FOLLOWING HIGH DOSE-RATE INTRACAVITARY AFTERLOADING IRRADIATION WITH CO60 (CATHETRON) AND CONVENTIONAL RADIUM THERAPY FOR ST. I-II CERVICAL CARCINOMA.

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Acta Obstet Gynecol Scand [Suppl]; (103):31-38 1981

From 1969 to 1976, 101 patients with St Ia-IIb cervical carcinoma were treated with the Cathetron (C) and 84 patients with radium (R). Surgery was carried out on 56.4% of the patients in Group C and 60.7% in Group R 2 wk after the intracavitary radiotherapy and 51.5% of the patients in Group C and 45.2% in Group R received external irradiation with or without an operation. There was no statistical difference in the survival between the two treatment groups, the 5-yr crude survival rate being 81.6% for Group C and 78.6% for Group R and the 3-yr crude survival rates 85.1% and 83.3% respectively. Local recurrence of tumor was more frequent in Group R (10.7%) than in Group C (3.0%) ($p = 0.03$). There were more early complications during or after the Cathetron (10.9%) than radium treatment (3.6%), without any statistical significance, however. No differences were found in operative difficulties or early postoperative morbidity between the two groups during or after radical operations after intracavitary radiotherapy. (Author abstract) (51 Refs)

22. COMPLICATIONS FOLLOWING HIGH AND LOW DOSE-RATE INTRACAVITARY RADIOTHERAPY FOR ST. I-II CERVICAL CARCINOMA: A COMPARISON OF REMOTELY AFTERLOADED CO60 (CATHETRON) AND CONVENTIONAL RADIUM THERAPY.

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Acta Obstet Gynecol Scand [Suppl]; (103):39-49 1981

A study was made to compare the incidence, quality and etiology of complications after low and high dose-rate intracavitary radiotherapy for St Ia-IIb cervical carcinoma in 185 patients, of whom 84 were treated with radium (R) and 101 with afterloaded Co60 (Cathetron, C), from 1969 to 1976. The frequency of surgery and external irradiation was similar in both groups. There were more ($p = 0.01$) complications in Group C (27.7%) than in Group R (13.1%). However, when the single fractions in the Cathetron treatment were lowered from 10 Gy to 7.5 Gy each in 1972, the incidence of complications decreased from 42.4% to 20.6% ($p = 0.02$) and the latter incidence was not statistically different from Group R. Intestinal complications were more frequent than urological ones in both groups. low wt was significantly (p less than 0.025) correlated with the development of complications and previous laparotomy ($p = 0.0001$) with the development of fistulae in Group C. (Author abstract) (57 Refs)

23. PARA-AORTIC LYMPH NODE IRRADIATION IN CARCINOMA OF THE CERVIX AFTER EXPLORATORY LAPAROTOMY AND BIOPSY-PROVEN POSITIVE AORTIC NODES.

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Int J Radiat Oncol Biol Phys; 8(1):13-18 1982

Pelvic and para-aortic lymph node (PALN) radiotherapy (RT) was administered following staging laparotomy in 23 women (34-75 yr old) with positive PALN and cervix neoplasms (18 squamous cell carcinomas, 5 adenocarcinomas). The delay between surgery and start of RT averaged 10 days. Cobalt-60 was used in all patients for external RT of fields including the pelvic, iliac, and para-aortic nodes. A daily tumor dose of 180 rad was delivered to the midplane of the abdomen and pelvis, in 5 daily fractions/wk. The majority of the patients received a total midplane dose ranging from 4,000 to 6,000 rad to the pelvis and from 5,000 to 5,500 rad to the PALN area by external RT. Intracavitary radium was used in the form of two inserts in 15/23 patients and one insert in 5/23. Five patients were alive with no evidence of disease 115, 110, 90, 73, and 45 mo after completion of RT. Three of the five surviving patients developed bowel complications requiring surgery. Fifteen patients died of cancer at an av of 21 mo. The av survival was 40 mo. Of 18 deceased patients, 5 had developed late bowel radiation damage, 3 requiring surgical intervention. Sites of failure were as follows: 5 pelvis, 2 lung, 2 generalized, 2 scalene lymph nodes, 1 lung and bone, 1 bone, 1 anasarca, and 1 unknown. During RT, the main side effects were nausea, vomiting, and diarrhea sufficiently severe in some patients to lead to difficulties in electrolyte balance and nutritional problems. (29 Refs)

24. GASTROINTESTINAL COMPLICATIONS AFTER RADIOTHERAPY FOR CARCINOMA OF THE UTERINE CERVIX.

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Can J Surg; 25(1):64-66 1982

Radiotherapy for invasive carcinoma of the uterine cervix caused gastrointestinal complications in 52 of 441 patients. External beam and intracavitary radiation together caused greater bowel damage than either method alone. Twenty-eight of the 52 patients required surgical intervention. Ileal stenosis in nine patients required primary resection with anastomosis in seven while the stenosis was bypassed in the other two. Acute perforation with peritonitis would require a diverting ileostomy and creation of a mucous fistula. A defunctioning colostomy was indicated for relief of pain, bleeding and stenosis of the rectum in 11 of 15 patients; 2 patients were treated by primary resection, 1 underwent abdominoperineal resection and another a pelvic exenteration. Of four patients with ileal and rectal involvement, one underwent right hemicolectomy and transverse colostomy, two had ileal resection and sigmoid colostomy and the other had hemicolectomy and rectal resection. All patients were well at follow-up from 3 to 120 mo after operation. A Hartmann's procedure is indicated when it appears that primary closure may not succeed. Individualized management is essential. (Author abstract) (13 Refs)

HEAD AND NECK NEOPLASMS

25. CHEMODECTOMAS ARISING IN TEMPORAL BONE STRUCTURES.

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Laryngoscope; 92(2):188-191 1982

Eighteen patients with chemodectomas arising in temporal bone structures were evaluated and treated at the University of Florida. Seventeen patients have each been followed a minimum of 3 yr. Patients were retrospectively staged as having 'local' or 'advanced' disease, depending on the presence or absence of bone destruction and/or cranial nerve involvement. Fourteen of the patients received radiation therapy as all or part of their therapy; 6 patients were treated with radiation therapy alone, 3 patients were irradiated immediately postoperatively for residual disease, and 5 patients had radiation therapy for recurrence after operation. They were treated with cobalt-60 radiation with doses ranging from 37 60 to 5640 rad. All irradiated patients demonstrated evidence of tumor regression, and none have had tumor recurrence with followup of 3-12 yr. Of the eight patients with cranial nerve paralysis prior to therapy, five had return of function of one or more cranial nerves. One of six patients treated initially with radiation therapy had a complication, while six of eight patients irradiated postoperatively had complications. None of the complications were fatal. Three patients treated by operation for early disease limited to the hypotympanum had the disease controlled for 11-12 yr. Guidelines for the selection of initial therapy are discussed. (Author abstract) (8 Refs)

26. THE POTENTIAL FOR ADJUVANT RADIOTHERAPY IN CHOROIDAL MELANOMA.

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Arch Ophthalmol; 100(2):247-248 1982

Controversy exists regarding the efficacy of enucleation in the management of choroidal melanoma. The effect of any form of ocular therapy on the prevalence of choroidal melanoma metastases is unknown. In a number of other systemic tumors, preoperative irradiation may lessen the occurrence of widespread disease. This type of therapeutic approach might be useful in the management of high-risk choroidal melanoma. In preliminary studies using 2,000 rad of preenucleation irradiation in patients with choroidal melanoma who have a poor prognosis, we have not observed notable morbidity. There are a number of limitations to the use of this adjunct therapy in choroidal melanoma management; however, a prospective national randomized trial of preenucleation irradiation in patients with high-risk choroidal melanoma might allow us to indirectly determine the effect of enucleation on the prevalence of choroidal melanoma metastases as well as delineate the potential role of this type of adjunct therapy in ocular melanoma. (Author abstract) (23 Refs)

27. POST-THERAPEUTIC RETINAL VASCULAR LESIONS.

Francois P, Fallas M-C, Castier P
Lille, France
Bull Soc Ophtalmol Fr; 81(8/9):575-577 1981

Complications of radiotherapeutic treatment of retinal tumors, malignant choroidal tumors, and retro-ocular tumors are reviewed and several cases are discussed. Patient age ranged from 7 mo in a child with bilateral retinoblastoma to 61 yr old in a man with a choroidal tumor. Irradiation of the eye and of retro-ocular tumors led to capillary and arteria sclerosis and retinal anoxia. Vascular sclerosis caused by radiotherapy led to the same complications that are observed in chronic occlusions. In certain cases, localized areas of edema with retinal edema surrounded by exudate were observed. In other cases, anoxia led to vascular proliferation with retinal hemorrhage which compromised the functional result that had been acquired. Complications of occular radiotherapy occur very gradually beginning 1 yr or more following therapy and can result from any type of radiotherapy. Careful follow-up of patients who have been irradiated is recommended. When complications have begun, little can be done to alter the course of their evolution. (no Refs) (In FRE)

28. RADIATION RETINOPATHY.

Brown GC, Shields JA, Sanborn G, Augsburger JJ, Schatz NJ, Savino PJ
Retina Vascular Unit, Wills Eye Hosp., Thomas Jefferson Univ., Philadelphia, PA
Trans Pa Acad Ophthalmol Otolaryngol; 34(2):144-151 1982

External beam radiotherapy (RT: 4,000-5,000 rad) was given to a 60-yr-old man with diabetes mellitus who had a choriodal tumor (a metastasis of an unknown primary) and a 55-yr-old man with an orbital lymphoma of the left eye. Both patients developed symptoms of retinopathy 19 mo after the end of RT. The second patient developed symptoms of bilateral retinopathy, which progressed to severe neovascular glaucoma in the left eye 30 mo after RT. This eye was enucleated and histological study disclosed retinal atrophy and no evidence of tumor. One man and two women (40-56 yr old) with unilateral choroidal melanomas were treated by 60Co shield RT (10,000 rad to the apex of the tumor) and developed symptoms of retinopathy 13-18 mo after the end of RT. One patient developed symptoms of pseudodiabetic retinopathy after 23 mo; the reduced visual acuity was caused by the ioss of foveal capillaries and cystoid macular edema. In another patient, the reduced visual acuity was caused by massive subretinal exudates from incompetent vessels of retinal and/or choroidal origin, surrounding the regressing tumor. The patient who developed retinopathy 13 mo after RT had a 19-yr history of occult diabetes. The loss of visual acuity was attributed to severe retinal capillary nonperfusion and neovascularization of the disk. The findings in this patient illustrated the combined adverse effects of diabetes and RT on the retina. (19 Refs)

29. CARCINOMA OF THE TONSILLAR REGION: A COMPARISON OF RADIATION THERAPY WITH COMBINED PREOPERATIVE RADIATION AND SURGERY.

Shrewsbury D, Adams GL, Duvall AJ, Maisel RH, Haselow RE
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Otolaryngol Head Neck Surg; 89(6):979-985 1981

The 2-yr outcome of combined radiotherapy (RT: 5,075 rads to the primary site, 4,000-5,000 rads to the lower neck and supraclavicular nodes) and surgery (en bloc composite resection, including radical neck dissection) or of full-course RT only (as above, except 7,000 rads to the primary site) was studied in 96 patients with tonsillar carcinomas. Patients developing second primary tumors and patients undergoing other types of tumor resection were excluded from the study. The presence of palpable lymph node invo lvement (55/96 patients) adversely affected the outcome, regardless of the size of the primary tumor. After 2 yr, 26/47 patients with negative nodes and 23/55 patients with palpable neck disease were alive with no evidence of disease (NED). The 2-yr NED survival rates, tabulated according to tumor size (T stage), were 86% in Stage T1 (12/14 patients), 66% in Stage T2 (14/21), 42% in Stage T3 (20/48), and 8% in Stage T4 (1/13). RT and combined therapy were about equally effective in patients with Stage T1 or T2 primaries and negative lymph nodes; in all other groups, the NED survival rate was better with combined therapy. Combined therapy is advised for T3 primaries, regardless of the extent of nodal involvement, and for T4 primaries if it is feasible to obtain negative surgical margins. Salvage surgery (composite en bloc resection, as above) was considered for patients relapsing after full-course RT, but it was impossible in 32/40 patients because of distant metastases, fixed neck nodes, or massive recurrences. After salvage surgery, 5/8 patients remained NED. Treatment failure was almost always at the primary site and/or the neck. Distant metastases (lung or liver) seldom developed without a local-regional recurrence. (15 Refs)

30. INTRAVITAL DOSIMETRY OF POSTOPERATIVE RADIOTHERAPY IN PATIENTS WITH ORAL CARCINOMA.

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Dtsch Zahnaerztl Z; 37(1):48-51 1982

Technique and clinical results of thermoluminescence dosimetry (TLD) in radiotherapy of oral carcinomas are presented.

TLD utilizes the activation of crystalline sensors by ionizing radiation. A series of lithium fluoride elements are inserted into synthetic tubes. Tubes are then positioned on the external skin surface; others are inserted according to individual case requirements into the oral cavity and/or spaces created by excision of tumor. Tubes in the oral cavity are positioned sublingually and on the root of the tongue. Measurements of radiation dosage to the tumor bed are obtained by inserting sensors into drainage tubes positioned during surgery. Advantages off TLD include direct measurement of energy doses, small size of the sensor elements, ease of calibration, and precision of the technique (+-2% error). TLD measures the energy delivered by ionizing radiation, rather than the dose of ionic particles. Evaluation of results of approx 700 individual clinical measurements with TLD indicated that radiation doses delivered to specific areas frequently are different from the planned dose as a result of inhomogeneities in tissues. TLD allows exact measurement of doses in living patients, permitting precise control of radiotherapy. (6 Refs) (In GER)

31. PREOPERATIVE SHORT-TIME IRRADIATION WITH TELECOBALT IN CASE OF SQUAMOUS CELL CARCINOMA OF THE FLOOR OF THE MOUTH.

Hering KG, Dieckmann J, Morgenroth K, Will CH
Chefarzt der Strahlenklinik, Kreiskrankenhauses Wetzlar, Forsthaustr. 1, D-6330 Wetzlar, W. Germany
Strahlentherapie; 157(11):699-704 1981

Between 1974 and 1979, 46 patients suffering from squamous cell carcinomas of the floor of the mouth in the Stages T1-3 N0-3 were submitted to preoperative short-term irradiations and postoperative saturating irradiations. After histological confirmation by instantaneous section examination, a focal dose of 18-20 Gy was administered within 3 days over opposed fields with wedge filter compensation into the middle of the floor of the mouth. Twenty to 21 hr later, radical operation with stage dependent neck dissection was effected. Two to 3 wk after the operation, the dose on the floor of the mouth was saturated up to 55-60 Gy. The homolateral lymph region received a max dose of 50 Gy over a ventral field. Eighty-one patients forming a control group - the randomization was made after admission to the hospital - were treated after radical operation with 55-60 Gy in the middle of the floor of the mouth and 50 Gy in the lymph outflow region. The postoperative healing proceeded without complications. The evaluation of survival rates according to Kaplan and Meier shows no difference between T1 and T3 tumors. In case of T2 tumors and independently of the N stage, the pre-irradiated patients show an improvement of the survival curve which is still continuing. On the whole, the group of pre-irradiated patients show a decrease of mortality of 8% and an increase of 15% of patients without tumors. (Author abstract) (23 Refs) (In GER)

32. ANALYSIS OF THE PARAMETERS RELATING TO FAILURES ABOVE THE CLAVICLES IN PATIENTS TREATED BY POSTOPERATIVE IRRADIATION FOR SQUAMOUS CELL CARCINOMAS OF THE ORAL CAVITY OR OROPHARYNX.

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Int J Radiat Oncol Biol Phys; 8(1):27-30 1982

Patients with squamous cell carcinomas of the oral cavity (56 patients) or oropharynx (46) were treated postoperatively with 5,000-6,500-rad radiotherapy. Recurrences above the clavicles appeared within 2 yr in 35/38 patients, within 30 mo in 95%, and within 3 yr in 100%. Of the total of 102 patients, 81 were evaluable for control of disease above the clavicles. In patients with T3 or T4 lesions, the incidence of failures at the primary site alone or with neck disease was 22% and 32%, respectively, for the oral cavity and oropharynx. Of the 8 patients with positive surgical margins who experienced a failure, the tumor doses were 5,000 rad in 2/8, 6,000 rad in 5/8, and 6,500 in 1/8. Within this group of eight patients, T4 predominated with an oropharynx primary, primarily on the posterior pharyngeal wall. In nine other patients, despite generous portals, a failure occurred close to or outside of the periphery of the portals. Neck failure with primary controlled was usually the result of no elective irradiation or uncertain dose. Failure rates for different studies are compared. Where definite disease exists at the margin of resection, 6,500 rad or in specific situations 7,000 rad should be given through reduced fields. (6 Refs)

33. RADIOTHERAPY FOR TUMORS OF THE GLOMUS JUGULARE.

Bataini JP, Kasdorf P, Brugere J, Poncet P, Jaulerry C, Bruinin F
Service de Radiotherapie, Institut Curie, 26, rue d'Ulm, F 75231 Paris, France
Ann Otolaryngol Chir Cervicofac; 98(4/5):239-242 1981

Eight patients with benign glomus jugulare tumors (GJT) were administered radiotherapy alone. The diagnosis of GJT was established in all cases by clinical and radiographic data. All patients had extensive bony destruction of the base of the skull. All patients were treated with high energy radiation from 4,400-6,000 rads. The disappearance of functional symptoms was rapid and often occurred near the end of radiotherapy. Osteolysis of the base of the skull remained unchanged during follow-up except for the occasional appearance of a light marginal sclerosis. In one case, post-therapeutic x-rays revealed a perfect reconstruction of the base of the skull. Six patients were free of recurrent disease 16, 10, 9, 7, 6, and 2 yr following radiotherapy. Two other patients could not be evaluated but were alive 12 and 8 yr following therapy. There were no secondary complications such as myelitis or osteoradionecrosis. The importance of using sufficient voltage to affect a cure is stressed. Previous trials have shown that doses less than 4,000 rads have been ineffective in controlling GJT. (15 Refs) (In FRE)

34. RADIATION THERAPY FOR SUBCLINICAL CARCINOMA IN CERVICAL LYMPH NODES.

Mantravadi R, Katz A, Haas R, Liebner EJ, Sabato D, Skolnik E, Appelbaum EL
Dept. Radiology, Univ. Illinois Hosp., 1740 Taylor St., Chicago, IL, 60612
Arch Otolaryngol; 108(2):108-111 1982

Radiotherapy alone was used to treat 187 patients with a head and neck cancer and clinically uninvolved lymph nodes. Delayed lymph node metastases developed in 35 (19%) patients, and concomitant tumor at the primary site was present in 90% of them. In 2 (1%) of the 187 patients, delayed metastases developed in the irradiated nodes with the primary tumor controlled; both of these patients received a radiation dose of less than 5,000 rad. Metastases in supraclavicular and posterior cervical regions occurred in 4% of the patients; and these sites were not included in the original radiation fields. The following conclusions were reached: (1) a radiation dose of 5,000 rad or more can eradicate 99% of the subclinical carcinomas in lymph nodes; (2) whole-neck irradiation is not indicated in patients with N0 stage tumor; and (3) surgical resection of primary tumors alone, without added neck dissection, may be

adequate if post-operative radiation therapy is planned. (Author abstract) (19 Refs)

35. FRAMEWORK INVASION BY LARYNGEAL CARCINOMA.

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Head Neck Surg; 4(3):200-208 1982

The accuracy of clinical and radiological findings was studied in 50 randomly selected patients (45 men and 5 women, 36-78 yr old) undergoing laryngectomy for squamous carcinoma (SC). SC was classified as Stage I or II in 22 cases and Stage III or IV in 26 cases. Primary treatment consisted of megavoltage radiation in 42 cases (38 curative and 4 preoperative). Preoperative chemotherapy was given in 24 cases. Total laryngectomy was performed on 46 patients and partial laryngectomy on 4 patients. Among 44 patients assessed before laryngectomy, 12 had referred ear pain; 11/12 patients with ear pain had invasion of the laryngeal framework or extralaryngeal soft tissues. Analysis of laryngeal tomograms correctly identified 10/14 transglottic tumors but incorrectly identified 7 other tumors as transglottic. Direct laryngoscopy failed to identify 3/8 transglottic tumors and underestimated the degree of infraglottic extension in 7/9 tumors. Transglottic tumors accounted for 21/27 over 2 cm in diameter with invasion of the laryngeal framework. In follow-up of 1 mo to 2.5 yr tumors recurred in 8/20 patients with invasion and 2/20 patients without invasion of the laryngeal framework. (22 Refs)

36. COMBINED LARYNGEAL CONSERVATIVE SURGERY AND IRRADIATION: CAN WE EXPAND THE INDICATIONS FOR CONSERVATION THERAPY?

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Otolaryngol Head Neck Surg; 89(6):974-978 1981

Laryngeal cancers in 39 patients (24 men, 15 women, 34-77 yr old, median 60 yr old) were treated by a combination of conservation surgery and pre- or postoperative radiotherapy (RT: 5,000-5,500 rads to the primary tumor; 5,000 rads to the lower neck area when lymph node involvement was present). These patients were selected for combined treatment because surgery or RT alone was deemed inadequate. One patient died of unknown causes in the postoperative period; the others were followed up for at least 18 mo. Lymph node metastases were present in 8/16 patients with supraglottic cancers. One patient developed neck metastases outside the treatment fields after 13 mo. Two patients died of other causes. After a median of 50 mo, 13/16 had no evidence of disease (NED). Lymph node metastases were present in 1/14 patients with glottic cancer. One patient died of unknown causes 3 wk postoperatively; the others were NED after a minimum of 18 mo. Lymph node metastases were present in 11/19 patients with cancers of the hypopharyngeal wall or pyriform sinus. Eight patients relapsed (7/8 at the primary site or neck, 1/8 distantly); one patient was successfully treated for a recurrence after 33 mo and was NED after 49 mo. Five patients died of other causes; 2/5 deaths were from pulmonary complications caused by persistent aspiration due to pharyngolaryngeal incoordination. After a median of 36 mo, 6/19 patients were NED. It is concluded that this combined treatment can control the cancer and preserve good function in the majority of patients. Because of the high recurrence rate in patients with carcinomas of the pyriform sinus and hypopharyngeal wall, adjuvant chemotherapy may be useful. (12 Refs)

37. THE SIGNIFICANCE OF LARYNGEAL EDEMA FOLLOWING RADIOTHERAPY OF CARCINOMA OF THE VOCAL CORD.

Fu KK, Woodhouse RJ, Quivey JM, Phillips TL, Dedo HH
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Cancer; 49(4):655-658 1982

Laryngeal edema persisting for more than 3 mo following radiotherapy developed in 38 of 247 (15.4%) patients irradiated for carcinoma of the vocal cord. In 17 (44.7%) of these patients, the laryngeal edema was associated with persistent or recurrent disease, although only 25.4% of the patients with uncontrolled disease had laryngeal edema. The incidence of laryngeal edema was 13.1% for T1 disease, 23.8% for T2, and 21.4% for T3 and T4 disease. It increased significantly with increase of min tumor dose greater than or equal to 7,000 rad or with NSD greater than 1,900 ret, being 46.2% with min tumor dose greater than or equal to 7,000 rad and 13.7% with min tumor dose less than 7,000 rad and 43% with NSD greater than 1,900 ret and 17% with NSD less than or equal to 1,900 ret. It also increased with increase of field size, being 13.4% with field sizes less than 6.0 x 6.0 cm2, and 24.4% with field sizes greater than or equal to 6.0 x 6.0 cm2. When laryngeal edema is progressive and unresponsive to conservative measures, multiple biopsies should be performed to establish the presence of persistent or recurrent disease before salvage surgery is attempted. However, if it is mild, stable, no visible recurrence develops, and especially if it is limited to the arytenoids, no biopsy should be attempted because of the risk of inducing laryngeal necrosis. (Author abstract) (11 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

38. HISTOPATHOLOGIC SUBCLASSIFICATION OF DIFFUSE HISTIOCYTIC LYMPHOMA AND RESPONSE TO THERAPY.

Stryker JA, Abt AB, Eyster ME, Lowman JG
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Radiology; 142(2):501-506 1982

In 55 patients with diffuse histiocytic lymphoma (Stages I-IV), the disease was subclassified as large cleaved-cell (17 patients), large noncleaved-cell (12 patients), mixed follicular-center cell (14 patients), blastic (6 patients), and pleomorphic pyroninophilic (6 patients). Two-year survival rates for these subclasses were 47%, 42%, 64%, 17%, and 33%, respectively, suggesting that histopathologic subclass is an important prognostic factor in diffuse histiocytic lymphoma. The mean tumor dose that produced local control in 22 patients who were treated with radiation therapy alone was 4,834 rad (48.34 Gy), whereas the mean tumor dose for local control when chemotherapy was used in combination with radiation therapy (16 patients) was 3,679 rad (36.79 Gy). This suggests that when chemotherapy is used with radiation therapy, a lower tumor dose will be sufficient to achieve local control than when radiation therapy is used alone. In addition, 43% of the patients who presented with an intra-abdominal primary lymphoma experi-

enced local failure following treatment. It is recommended that patients who present with an abdominal primary tumor be treated aggressively with combined modality therapy whenever feasible. (Author abstract) (18 Refs)

39. THYROID FUNCTION AFTER MANTLE FIELD RADIATION THERAPY.

Dahnert W, Kutzner J, Grimm W
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Strahlentherapie; 157(8):499-507 1981

Forty eight patients with malignant lymphoma received a 60Co-radiation of 30 to 50 Gy using the mantle field technique. Thyroid function tests were performed 34 to 92 mo after radiation therapy. One patient developed myxedema, 10 (20.8%) had subclinical hypothyroidism and 6 (12.5%) latent hypothyroidism. The incidence of hypothyroidism after treatment of malignant lymphomas is summarized in a review of the literature. Discrepancies on the incidence of hypothyroidism were found, and their possible cause is discussed. Periodic examinations of all patients with thyroid radiation exposure are recommended. The examination can be limited to measurement of TSH concentration and palpation of the thyroid for nodules. (Author abstract) (38 Refs) (In GER)

40. EFFECT OF CENTRAL NERVOUS SYSTEM RADIOTHERAPY IN CHILDREN WITH ACUTE LYMPHOBLASTIC LEUKEMIA ON LYMPHOCYTE SUBPOPULATIONS AND INDICATORS OF LEUKOCYTE MIGRATION INHIBITION IN THE PERIPHERAL BLOOD.

Cesarz-Kruz E, Lukas A, Sroczynska M, Lukas W, Sonta-Jakimczyk D
Klinika Pediatrii, Sl. AM, ul. 3 Maja 13/15, 41-800 Zabrze, Poland
Pediatr Pol; 56(9):1003-1007 1981

The effects of polychemotherapy and prophylactic cranial irradiation (total dose 2,400 rads) on peripheral blood lymphocyte subpopulations and on leukocyte migration inhibition were studi ed in 17 children (15 mo to 17 yr old) with null-cell acute lymphoblastic leukemia compared with 30 healthy controls. During remission after induction chemotherapy but before cranial irradiation, the percentages of T, B and null cells were 23.70%, 18.58% and 60.60%, respectively, compared with 64.45%, 23.73% and 10.8% in the controls. The decreases in the T and B cell counts and the increase in the null cell counts compared with the controls were statistically significant. The leukocyte migration indices were 0.833-0.938 vs 0.419-0.625 in the controls. After cranial irradiation the percentages of T, B and null cells were 20.25%, 12.5% and 65.10%, respectively, and the leukocyte migration indices were 0.881-0.887. The depressive effect of the irradiation affected mostly the B cells, and caused no significant changes in the leukocyte migration inhibition. (27 Refs) (In POL)

MUSCULOSKELETAL NEOPLASMS

41. MULTIDISCIPLINARY TREATMENT OF SOFT TISSUE SARCOMAS: AN IMPROVEMENT IN PROGNOSIS.

Abbatucci JS, Boulier N, Mandard AM, De Ranieri J, Tanguy A, Chasle J
Service des Radiations, Centre Francois-Baclesse, route de Lion-sur-Mer, F. 14021 Caen Cedex, France
Bull Cancer (Paris); 68(5):428-436 1981

The results obtained in the treatment of 45 cases of soft tissue sarcomas are presented. All cases were reviewed and classified according to the modern criteria of malignancy. The treatment schedule comprised: (1) preoperative irradiation: 2 sessions of 6.50 Gy in 48 hr, target volume: whole limb segment; (2) surgical excision 48 hr later with systematic intraoperative histologic verification, until healthy tissue margins are obtained; (3) postoperative irradiation: 3 wk later delivering a cumulative total dose of 50.00 Gy to the preoperative vol and 60.00-70.00 Gy to a reduced vol encompassing the surgical region with protection of vascular axes where possible; (4) chemotherapy: Actinomycin D 0.3 mg/m2 half an hour before the first five sessions of postoperative irradiation; (5) bilateral lung irradiation: four sessions of 3.75 Gy in 7 days to the whole chest. The results were as follows: local recurrence rate was 9.5% at 5 yr. In 21 cases in whom surgical excision was deemed histologically adequate, no recurrences were seen at 3 yr (minimum follow-up). Survival at 5 yr was 77%. Deaths were due to metastatic spread, especially to the lungs. These results show an improvement as compared with historical series. New progress should be sought in combining a more aggressive type of chemotherapy for cases with high metastatic risk. (Author abstract) (32 Refs) (In FRE)

42. RADIOTHERAPY FOR MALIGNANT MELANOMA: A RE-APPRAISAL.

Harwood AR, Cummings BJ
Dept. Radiation Oncology, Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Cancer Treat Rev; 8(4):271-282 1981

Indications for radiotherapy (RT) of cutaneous melanoma were evaluated by review of clinical and radiobiological literature, which shows that the disease is not a radioresistant tumor. Indications for RT in lentigo maligna (LM), lentigo maligna melanoma (LMM), superficial spreading melanoma (SSM), and nodular melanomas (NM) are discussed. Results of RT using the Miescher technique and of conventional RT in LM and LMM, results of RT for SSM, results of local excision and postoperative radiation of NM, and results of RT in 0, 7, and 21 fractionated doses, are presented. Fractionated RT plays a substantial role in treatment of LM and LMM, particularly in those of the head and neck. NM arising de novo is not a radioresistant tumor. Evidence suggests that large dose per fraction RT is more effective than conventional RT in the treatment of NM. NM is a tumor with variable radiosensitivity. Local excision and large dose per fraction (4,500 rad in 10 fractions) RT is indicated in NM of the head and neck where wide excision might not be possible or where cosmetic factors are important, in patients with NM following lymph node dissection who are at high risk of developing local or regional recurrence. Such RT produces a high response rate and long-term control of NM recurrent after surgery, or where it is primarily unresectable. Palliative RT is of benefit for relief of symptoms from distant metastases from melanoma. (39 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

43. ON THE PROBLEM OF RADIOTHERAPEUTIC MEASURES IN ADDITION TO CHEMOTHERAPEUTIC TREATMENT OF THE MICROCELLULAR BRONCHIAL CARCINOMA: ANALYSIS OF RECURRENCE RATES.

Schulz U, Niederle N, Seeber S
Strahlenklinik am Klinikum der GHS, Hufelandstr. 55, D-4300 Essen 1, W. Germany
Strahlentherapie; 157(10):628-632 1981

Eighty-three patients with small-cell bronchial carcinomas were treated with a combination of cytostatic chemotherapy ('ACO II' = adriamycin, cyclophosphamide, vincristine) and irradiation of the mediastinum, the tumor umbra and the affected hilum with a focal dose of 30 Gy administered within a period of 3 to 4 wk. During the same period, those patients presenting the favorable initial stage 'limited disease' (LD) were additionally submitted to a prophylactic total brain irradiation with a dose of 30 Gy. Forty-two among 55 patients of Stage LD had a complete remission. Among these 42 patients, 14 had an intrathoracic recurrence, 9 of them within the irradiation field. A cerebral recurrence after prophylactic brain irradiation was found in 5 of 42 cases. The conclusion is drawn that the irradiation dose which has to be administered into little intrathoracic fields must be increased. A dose of 45 Gy within 4 1/2 wk is desirable. It seems that a prophylactic brain irradiation is only efficient in patients with a favorable prognosis (LD, CR). (Author abstract) (37 Refs) (In GER)

44. RADIATION THERAPY IN THE MANAGEMENT OF PATIENTS WITH MESOTHELIOMA.

Gordon W, Antman KH, Greenberger JS, Weichselbaum RR, Chaffey JT
(c/o Greenberger) Dept. Radiation Therapy, Joint Center Radiation Therapy, Harvard Medical Sch., 50 Binney St., Boston, MA, 02115
Int J Radiat Oncol Biol Phys; 8(1):19-25 1982

Twenty-seven patients with malignant mesothelioma were treated with curative (CRT: 8 patients: 5 men, 3 women; 26-60 yr old) or palliative (PRT: 19 patients: 18 men, 1 woman; 9-77 yr old) radiotherapy. Radical surgery was performed on all CRT patients. Two forms of CRT were planned: implant for small sites of residual disease with radioactive gold seeds or external beam radiotherapy to sites outlined as foci of residual disease by surgical clips placed intraoperatively. CRT was delivered to the chest postoperatively in 5/8 patients. Lung irradiation was also delivered to one patient who had received preoperative chest irradiation. Abdominal CRT was administered to two patients. CRT doses ranged from 5,600 rad in 43 days to 2,200 rad in 15 days. Combination adriamycin-containing chemotherapy regimens were used in 5/8 patients. Of eight patients, one achieved a 2-yr disease-free interval, one had persistent abdominal disease at 18 mo, and the other six suffered local recurrence within 8-13 mo of treatment initiation. PRT doses ranging from 800 rad in two fractions to 5,700 rad in 29 days were administered for treatment of pain (8 patients), superior vena cava obstruction (3), dyspnea or bronchial obstruction (5), difficulty in swallowing (1), and brain metastases (1). Complete relief of symptoms was achieved in one patient, significant relief of pain or shortness of breath in four, and moderate relief in six. Doses of 4,000-5,000 rad delivered in six courses produced significant relief of symptoms in four patients. Lower doses did not effectively relieve symptoms. (18 Refs)

45. RADIOTHERAPY OF THE THYMOMA.

Lindner H, Burger K, Atzinger A
Institut und Poliklinik fur Strahlentherapie und radiologische Onkologie, Klinikums rechts der Isar, Langerstr. 3, D-8000 Munchen, W. Germany
Strahlentherapie; 157(8):487-498 1981

A report is given on 24 thymomas irradiated between 1971 and 1980. Ten patients were irradiated after a radical thymectomy, 3 after partial resection and 11 after histologic diagnosis alone. The patients were treated by different irradiation methods, mostly with the photons of a Co60 unit and a 43 MeV betatron. The average focal dose was 45 Gy which were administered within 5 wk. The observation period was 5 yr on an average. The general 5-yr survival probability was 54%; some partial collectives were evaluated individually. These studies show that by unique radiotherapy, too, a 2-yr survival rate of 100 % and a 5-yr survival rate of 50% as well as a local recurrence rate of about 20% can be reached. Patients under 40 yr with epithelial thymomas and a dose of less than 40 Gy have a less favorable prognosis. Compared to other authors, a relatively high rate of remote metastases was observed which necessitated extensive follow-up measures and suggests an adjuvant chemotherapy. (Author abstract) (44 Refs) (In GER)

INSTRUMENTATION AND TECHNOLOGY

46. IMPROVEMENT OF THE RADIOLOGICAL PROTECTION IN THE INTERSTITIAL RADIOTHERAPY WITH RADIOGOLD SEEDS.

Schmidt J
Radiologische Klinik der Stadtischen Krankenanstalten Bielefeld-Rosenhohe, Rosenhohe 27, D-4800 Bielefeld 14, W. Germany
Strahlentherapie; 157(1):29-32 1981

In spite of all its advantages, the interstitial therapy with radiogold seeds has the disadvantage to expose the staff to a higher radiation loading than other nuclides and therapy methods. For the application of an implantation cannula with linear arrangement of the radiogold seeds before the ejector (according to Hellriegel), the authors propose a simple device which can be self-fabricated, to protect from gamma radiation during transport and laying down to the set ready for use. Construction and application are described. At a distance of 10 cm from the lead container, the radiation dose amounts to 0.3 mR/hr per 1 mCi (37 MBq) of the activity of the seeds. The use of interstitial radiotherapy is also possible in small departments. The authors inform about their practical experiences gained during the treatment of 26 patients. (Author abstract) (8 Refs) (In GER)

47. A NEW TYPE OF RADIOACTIVE WIRES AND 'HAIRPINS' FOR THE INTERSTITIAL CURIETHERAPY OF MALIGNANT TUMORS.

Michailov MI, Majkarov SA, Sachatschiev AA, Mouschmov MD, Teherani DK
(c/o Teherani) Institut fur Biologie, Forschungszentrum Seibersdorf, A-2444 Seibersdorf, Austria
Strahlentherapie; 157(1):25-28 1981

A new method has been developed for the production of radioactive wires and 'hairpins' showing a linear increase of specific activity from their middle up to their ends. The advantages offered by these wires and 'hairpins' have been intro-

duced with good results in a series of new implantation methods for the interstitial curietherapy of malignant tumors. (Author abstract) (15 Refs) (In GER)

48. METHODS FOR ROUTINE CALIBRATION OF BRACHYTHERAPY SOURCES.

Williamson JF, Khan FM, Sharma SC, Fullerton GD
Dept. Therapeutic Radiology, Univ. Minnesota Hosp., Minneapolis, MN, 55455
Radiology; 142(2):511-515 1982

Two types of routine geometry calibrators, the nuclear medicine dose calibrator and a Lucite jig holding a 30-ml external beam ion chamber with the source in a rigid geometry, were compared with open-air measurements for 137Cs, 192Ir, and 226Ra brachytherapy sources. The proximity of scattering surfaces in the second apparatus resulted in significant distortion of the buildup effect and deviation from the inverse square law (5% to 15%). For the dose calibrator, the response/Roentgen was found to be dependent not only on source energy, but on source capsule thickness as well. Approximately one half of the observed variation (27%) in calibration factors was accounted for by differences in filtration among sources. A mathematical logarithm that corrects for these geometric and filtration effects is presented. In addition, the activity assay procedure provided by the manufacturer of the dose calibrator is shown to be unsuitable for brachytherapy sources. Steps to overcome these problems are discussed. (Author abstract) (17 Refs)

49. RADIATION PARAMETERS OF 6 TO 20 MEV SCANNING ELECTRON BEAMS FROM THE SATURNE LINEAR ACCELERATOR.

Pfalzner PM, Clarke HC
Physics Dept., Ontario Cancer Treatment and Res. Foundation, Ottawa Clinic, 190 Melrose Ave., Ottawa, Ontario K1Y 4K7, Canada
Med Phys; 9(1):117-120 1982

Depth doses of the scanning electron beams from the Saturne Therac-20 linear accelerator at nominal energies of 6, 9, 13, 17, and 20 MeV were measured in polystyrene using a thin window parallel plate ionization chamber. Central axis depth dose curves are derived and are analyzed according to the method of Brahme and Svensson. For each of the five electron energies, values are obtained for the most probable energy at the absorber surface Ep,0, the practical range Rp, the 50% range R50, the therapeutic range R85, the electron dose gradients, total collision energy losses, and other radiation parameters, and these are compared to corresponding values for electron beams from a 22 MeV medical microtron and a 20 MeV betatron. (Author abstract) (5 Refs)

50. MEASUREMENT OF THE NEUTRON STRAY RADIATION IN THE IRRADIATION FIELDS OF MEDICAL ELECTRON ACCELERATORS.

Ewen K, Sprengel V
Zentralstelle fur Sicherheitstechnik, Strahlenschutz und Kerntechnik, die Gewerbeaufsicht Landes Nordrhein-Westfalen, Gurlitttstrasse 53a, D-4000 Dusseldorf, W. Germany
Strahlentherapie; 157(11):730-737 1981

The neutron and photon dose as well as the effective neutron energy were determined by means of albedo dosimetry for four different electron accelerators (2 linear accelerators and 2 betatrons). Thermoluminescence dosimeters (TLD) were used as detectors. The neutron dose can be calculated from the difference of the measured values of TLD 600 (6LiF)-sensible to neutrons and gamma rays- and TLD 700 (7Lif)-sensible only to gamma rays. The following aims were pursued: (1) hints regarding the construction of a radioprotection against neutrons, (2) information about the exposure to radiation of the patient because of neutron stray radiation outside the useful irradiation field. (Author abstract) (16 Refs) (In GER)

51. RESULTS OF LOCAL TRANSURETHRAL HIGH FREQUENCY HYPERTHERMIA IN BLADDER CARCINOMA.

Bichler KH, Harzmann R, Flachenecker G, Fastenmeier K, Altenahr E, Gericke D, Fluchtner SH
Urologische Abteilung, Universitatskliniken, Calwer Strasse 7, D-7400 Tubingen, W. Germany
Urologe [A]; 21(1):12-19 1982

Local, transurethral high-frequency hyperthermia (HFH) was used to treat 64 patients (49 men, av age 66.6 yr and 15 women, av age 67.0 yr) with bladder tumors (53 urothelial carcinomas, 5 squamous cell carcinomas, 3 bladder metastases of previously treated carcinoma of the renal pelvis, 2 adenocarcinomas, and one fibrosarcoma). During a 48-mo observation period 21 patients (17 men and 4 women) died 2-26 mo after treatment. Most (61.9%) of the patients who died had tumors in Stage T3G3. The mortality rate was 46.6% for patients with T3G3 tumors and 100% for patients with T4 tumors. The mortality rate for patients with T3G2 tumors was 66.7%, but the difference from the rate for T3G3 tumors was not significant. No patients with tumors in stages T1G1, T1G2, T2G1, or T2G2 died. Results indicated that HFH did not improve the prognosis for T4 tumors or advanced adenocarcinoma of the bladder. HFH produced tumor-specific damage to tumor tissue without causing permanent side effects in normal tissue. HFH produced tumor necrosis and stromal hyalinosis. Palliative effects included reduction in tumor volume, improvement in local operability, and interruption of tumor-related macrohematuria. (36 Refs) (In GER)

52. WHOLE-BODY HYPERTHERMIA AND CHEMOTHERAPY FOR TREATMENT OF PATIENTS WITH ADVANCED, REFRACTORY MALIGNANCIES.

Herman TS, Zukoski CF, Anderson RM, Hutter JJ, Blitt CD, Malone JM, Larson DF, Dean JC, Roth HB
Section Hematology Oncology, Little Rock Veterans Admin. Medical Center, 300 E Roosevelt Road, Little Rock, AR, 72205
Cancer Treat Rep; 66(2):259-265 1982

Eleven patients with unresponsive, disseminated cancers received 30 treatments with whole-body hyperthermia (WBH) and chemotherapy. The protocol was designed to treat patients at 42.0 C, 42.2 C, and 42.4 C for 2.5-3 hr (depending on tolerance) in successive treatments given 7-10 days apart. WBH was accomplished in six patients using heated blankets and in five patients by heating extracorporeally circulated blood. Fourteen treatments were at 42.0 C, 8 at 42.2 C, 6 at 42.4 C, and 2 at 41.8 C. Twenty-seven treatments (90%) lasted greater than or equal to 2.5 hr. At peak temperature, seven patients received 60 mg/m2 of cisplatin iv and four patients received 50 mg/m2 of BCNU (carmustine) iv (1 patient also received 300 mg/m2 of methyl-GAG iv over 2 hr on each of 3 days prior to WBH and BCNU). Six of 10 evaluable patients (60%) achieved a partial remission (median duration, 9 wk; range, 5-24): two of three patients with melan oma, two of three with colon carcinoma, one of two with sarcoma, and one of two with lymphocytic malignancies. No response advantage was observed for either heating modality or for any drug regimen. Major toxic reactions included hypotension during and after treatment, a

'capillary leak' syndrome associated with pulmonary edema, and disseminated intravascular coagulopathy. Two patients died as a result of these complications (both after treatment at 42.0 C). Subjective complaints related to therapy were associated with superficial burns (in patients treated with blankets) and generalized fatigue. Technical advances that have decreased the severe toxicity of treatment are discussed. In addition, methods are proposed to screen for responsive patients and to maximize antitumor interactions of chemotherapy and WBH. (Author abstract) (15 Refs)

PRE-CLINICAL STUDIES

53. THE EFFECT OF DOSE RATE AND ADRIAMYCIN ON THE TOLERANCE OF THORACIC RADIATION IN MICE.

Sherman DM, Carabell SC, Belli JA, Hellman S
(c/o Hellman) Dept. Radiation Therapy, Joint Center for Radiation Therapy, 50 Binney St., Boston, MA, 02115
Int J Radiat Oncol Biol Phys; 8(1):45-51 1982

The effect of pre-administration of adriamycin (ADR: 8 mg/kg iv) on radiation tolerance of the lung and esophagus was studied in male C3H-HeJ mice. For the three radiation dose rates of 5, 15, and 70 rad/min, the LD50 curves for oral-esophageal mortality calculated from deaths occurring in the first 30 days (LD50/30) were 2,723, 1,880, and 1,900, respectively. Pulmonary death LD50/160-30 values were 2,574 and 1,636 rad for 5 and 70 rad/min. The dose of radiation necessary to give pulmonary and gastrointestinal toxicity was markedly reduced when ADR was administered 24 hr before irradiation. With a 1-wk interval between ADR administration and irradiation, only the high-dose (1,600 rad) group showed an increased effect. The effect of ADR on the dose rate effect was analyzed. For the same dose of radiation, higher mortality was observed for the higher dose rate (70 rad/min) than with the lower dose rate (5 rad/min). For pulmonary toxicity, a similar difference was observed. The trend for both oral-esophageal and pulmonary mortality indicated that ADR reduces the importance of the dose rate of radiation. Enhancement ratios were calculated. (23 Refs)

54. DIFFERENT EFFECTIVENESS OF HYPERTHERMIA WITH REGARD TO FAST ELECTRONS AND X-RAYS WITH DIFFERENT ENERGY SPECTRA.

Schrader-Reichhardt U, Markus B
Abteilung fur Strahlenphysik und Strahlenbiologie, Radiologischen Universitatsklinik, v.-Sieboldstr. 3, D-3400 Gottingen, W. Germany
Strahlentherapie; 157(8):544-552 1981

The synergistic enhancement of the irradiation effect by mild (40.5 C) and strong (43 C) hyperthermia (TER = temperature enhancement ratio) was examined for different sparsely ionizing radi ation qualities (15 MeV electrons in two irradiation depths corresponding to a relative depth dose of 100% and 30%, 200-kV and 29-kV-x-rays). Hypotetraploid ('4n') and diploid (2n), asynchronous, exponentially growing CHO fibroblasts were used as experimental subjects. The survival in the colony test was used as criterion to assess the effect. The experiments carried out with 4n cells showed that, for the two temperatures, the TER decreases with increasing ionization density, and, when applying fast electrons producing an extremely sparse ionization in an irradiation depth of 100%, the TER shows a maximum increase as compared to the more densely ionizing radiation qualities. Already when mild hyperthermia is employed, fast electrons show a TER of 1.25 which rises to about 2.25 at 43 C. In case of 29-kV-x-rays, these values amount to 1 and 1.66 respectively. As to the 2n cells, the TER reaches here the double value and seems to be similarly dependent on the ionization density. (Author abstract) (41 Refs) (In GER)

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Radiation Therapy

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BREAST NEOPLASMS

1. THE PLACE OF RADIOTHERAPY AS A PRIMARY MANAGEMENT OF BREAST CANCER.

Nervi C, Arcangeli G, Danesi DT, Creton G
Istituto Medico e di Ricerca Scientifica, Via Luigi Bodio 58, 00191 Rome, Italy
Tumori; 68(1):73-80 1982

From March 1972 to November 1979 a total of 157 patients with Stage I to III primary breast cancers have been irradiated after segmental resection (12 cases), tylectomy (89 cases) or biopsy (56 cases). Complete local control was achieved in all

HE 20.3173/2:

Stage I lesions, in 97% Stage II lesions and in 68% Stage III lesions. Nonrecurrence has been observed in patients previously operated by segmental resections, while local failures occurred in 6/89 and in 16/56 patients operated by tylectomy or biopsy, respectively. Of the 28 Stage I patients, 24 (86%) are alive, 1 with distant metastases. Four patients of this group are dead, two of intercurrent disease and two of breast cancer. Of the 61 (Stage II) patients, 38 (62%) are alive, 5 of these with distant metastases. Twenty-three patients are dead, 15 with active disease, and 8 suffered intercurrent death. Of the 68 Stage III patients, 21 (31%) are alive, 6 of these with distant metastases. Forty-seven patients are dead, 43 of breast cancer and 4 of intercurrent disease. The high probability of initial subclinical deposits is evidenced by the fact that 49 of the 68 patients in this group developed distant metastases. The patients with T1 lesions appear to comprise the most favorable group with a relapse free survival at 5 yr of 76%. The 5-yr relapse free survival was 62% for T2 lesions and 25% for T3 and T4 lesions. N0 status does not confer the same favorable prognosis as T1 status. N+ status, however, resulted in a definitely negative prognostic factor. Cosmetic results after our treatment approach appear to be extremely good. A marked difference between the irradiated and contralateral breast occurred only in 10 of the 125 patients after a minimum of 2 yr' observation. (Author abstract) (27 Refs) (In ITA)

2. TREATMENT OF EARLY BREAST CANCER WITH PRIMARY RADIATION THERAPY: RATIONALE, RESULTS, AND TECHNIQUES.

Weissberg JB, Prosnitz LR

Dept. Therapeutic Radiology, Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT, 06510

Bull NY Acad Med; 58(2):203-213 1982

Rationale, results, and techniques of primary radiation therapy (RT) for early breast cancer (BC) treatment are reviewed. RT is a local form of therapy designed to kill cancer cells within the treatment area. RT has a great advantage over surgery in preserving the breast and producing superior functional and cosmetic results. Radical surgery (RS) is viewed as inadequate treatment for advanced disease not only because of distant metastases but because of the frequency of local recurrence. Primary RT without mastectomy for operable BC has been used for several decades. Two hundred and ninety-three patients with BC in Stage I and II, were treated with primary RT without mastectomy. Five yr survival rates were 91% for Stage I and 77% for Stage II. The overall local recurrence rate was 8%. Complications occurred in 40 patients, the great majority of which was not serious. No fatalities were attributed to the treatment. Results of other studies suggest that lumpectomy is advantageous when RT without mastectomy is undertaken. Patients undergoing primary RT receive a dose of 4,500-5,000 rad over 5 wk, 5 fractions/wk, administered to the entire br east. If the axillary nodes contain metastases, supraclavicular and internal mammary nodes are irradiated. Following completion of large beam therapy, a boost dose is administered to the area where primary tumor was originally located. The purpose of the boost dose is to minimize the volume being treated and to avoid completely any damage to the underlying tissues. The patient is usually given an additional 1,600-2,000 rad in fractions of 200 rad each. (32 Refs)

3. THE MANAGEMENT OF BREAST CARCINOMA BY PRIMARY RADIOTHERAPY AT MOUNT SINAI HOSPITAL FROM 1962-1979.

Balawajder I, Antich PP, Boland J

(c/o Boland) Dept. Radiotherapy, Mount Sinai Sch. Medicine, 1 Gustave L. Levy Place, New York, NY, 10029

Cancer; 49(8):1587-1596 1982

Two-hundred eight patients with carcinoma of the breast were treated with megavoltage irradiation as the primary method of local management at Mount Sinai Hospital between 1962-1979. The effects of treatment volume, technique, and other parameters are discussed for the Stage I and II patients, together with the importance of tumor size and nodal status in control of local disease and distant metastases. In this series the cumulative probability of freedom from metastases is 93 +-5% when the irradiation is confined to the breast and axilla as compared with 72 +-9% when extended fields are used, with no difference in local control. Based on these results it was decided to confine irradiation to the breast and axilla alone in the majority of early stage cancer patients. Recommendations are made for radiation techniques and dosages to optimize control of the disease, minimize complications, and facilitate systemic therapy in patients with positive nodes. (Author abstract) (30 Refs)

4. RESULTS IN PATIENTS WITH BREAST CANCER TREATED BY RADICAL MASTECTOMY AND POSTOPERATIVE IRRADIATION WITH NO ADJUVANT CHEMOTHERAPY.

Tapley ND, Spanos WJ, Fletcher GH, Montague ED, Schell S, Oswald MJ

(c/o Fletcher) Radiotherapy Dept., Univ. Texas, M.D. Anderson Hosp., 6723 Bertner Drive, Houston, TX, 77030

Cancer; 49(6):1316-1319 1982

In 1963 an electron beam became available, making irradiation of the chest wall technically easy. In addition to peripheral lymphatic irradiation in patients with positive axillary nodes and/or the tumor in the inner quadrants or centrally located, patients with tumor larger than 5 cm or with grave signs and/or a significant incidence of positive axillary nodes received chest wall irradiation. None of the patients has received elective chemotherapy. Disease-free survival rates at 10 yr are 54% for the overall group, 79% for the patients with negative nodes, 44% for patients with positive nodes, 61% for patients with 1-3 positive nodes, and 33% for patients with four or more positive nodes. The incidence of peripheral lymphatic failures is low as well as the incidence of failures on the chest wall in the patients having had chest wall irradiation. With the availability of electron beam and adjustments in doses, complications are nonexistent. The incidence of treatment failures, local-regional, or distant, that have appeared by 10 years are compared with the incidence of failures that were experienced by the placebo patients in the clinical trial of the NSABP of thio-TEPA versus placebo. The clearly lesser incidence of treatment failures in the University of Texas M D Anderson Hospital patients either suggests that postoperative irradiation may have survival benefits or that the data of the NSABP series are not representative of all series. (Author abstract) (17 Refs)

5. BREAST CARCINOMA METASTATIC TO THE CHOROID: ANALYSIS OF 67 PATIENTS.

Mewis L, Young SE
Dept. Ophthalmology, Herman Eye Center, 1203 Ross Sterling Ave., Houston, TX, 77030
Ophthalmology (Rochester); 89(2):147-151 1982

During an 8-yr period in which 250 women with breast cancer underwent ocular examination, choroid metastases were found in 58/152 with ocular signs or symptoms and 9/98 without symptoms. Median age of these 67 subjects at diagnosis of choroid involvement was 51 yr (28-71). A median interval of 3 yr (0.5-14.25) had passed since diagnosis of breast cancer. Forty patients had pulmonary metastasis and 30 had CNS metastasis. Most (27) of the pulmonary spread was diagnosed prior to ocular diagnosis, but most of the CNS spread was diagnosed concurrent (15) with or subsequent (13) to ocular diagnosis. Median time to ocular diagnosis after pulmonary diagnosis was 13 mo (1-39). Longest survival after ocular diagnosis was 4 yr with four subjects still alive, but the median was only 9 mo. Metastasis was bilateral in 21 patients initially, rising to 27 within 9 mo, and unilateral in 40 (18 right, 22 left). Survival time did not correlate with the presence or absence of multiple tumors per eye. Radiotherapy was almost universally beneficial to visual acuity (94.2% had stabilization or improvement in vision). Indications for radiotherapy were retinal detachment, actual or threatened decreased visual acuity, or rapid tumor growth during systemic therapy. Dosage recommended was 2,500-3,000 rads in 10 fractions, by the lateral portal. (10 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

6. CURRENT EXPERIENCE WITH STEREOTACTIC IRRADIATIONS IN THE TREATMENT OF HEMISPHERIC GLIOMAS.

Szikla G, Betti O, Szenthe L, Schlienger M
Service de Neurochirurgie B, Centre Hospitalier Sainte-Anne, 1, rue Cabanis, F 75014 Paris, France
Neurochirurgie; 27(5):295-298 1981

Implanted or injected stereotactic irradiation was used in the treatment of 11 malignant gliomas, 28 astrocytomas, and 17 recurrent, low grade gliomas. The mean survival of the patients with malignant gliomas was 12.7 mo, and all patients died. Irradiation treatment for malignant gliomas is recommended because of good tolerance of the treatment. The apparent stabilization for good clinical cases lasted an av 10 mo with subsequent rapid deterioration. Three patients with astrocytomas died 4, 8, and 13 mo after irradiation. There were no clinical or radiographic signs of tumor growth in 19 cases. Functional deficits occurred in four patients, and six patients (21%) showed signs of recurrence after an av remission period of 2 yr without functional loss during that time. Irradiation therapy was associated with the disappearance or diminution of epileptic seizures in several patients in this group. The secretions of the cystic wall were stopped in 15/17 patients receiving injected irradiation. In three patients retreatment was necessary at 1, 2, and 4.5 yr following the original therapy. Immediate surgical risks and late functional loss were low in all groups tested. (10 Refs) (In FRE)

7. ROLE OF RADIATION THERAPY IN THE MANAGEMENT OF MENINGIOMA.

Carella RJ, Ransohoff J, Newall J, Salcman M, Matsui T
Dept. Radiation Oncology, New York Univ. Medical Center, 500 First Ave., New York, NY, 10016
Neurosurgery; 10(3):332-339 1982

Radiation therapy (RT) of 68 patients (49 females, 19 males; 25-80 yr old) with meningiomas is reviewed. Surgery followed by RT was treatment of 43 patients, 42 with known residual tumor and 1 with a malignant meningioma thought to be totally removed. RT was used for 14 patients with recurrence following surgery: combined with surgery in 11 and alone in 3. RT as primary treatment was used in 11 patients without pathological confirmation of tumor. The most common tumor locations were the parasagittal region, on the cerebral convexities, and on the sphenoidal ridge. The usual tumor dose was 5,500-6,000 rad in 6-6.5 wk (range 5,000-7,7000 rad with one patient initially receiving 6,000 rad followed by 4,000 rad for recurrence). Of the 43 patients treated with surgery and postoperative RT, 41 survived and 2 died during follow-up periods of 1-10 yr. All these patients maintained their best neurological classifications. Of the 14 patients treated with RT for recurrence, 5 patients showed improved neurological function, 2 remained unchanged, and 7 deteriorated; 5 patients died of tumor 1-3 yr following treatment. All 11 patients treated with RT alone as initial therapy survived for 3-6 yr; 9 showed neurological improvement and 2 remained stable. Of 11 patients with malignant meningiomas, 3 died of disease. Four case reports are presented illustrating clinical, pathological, and radiological responses. Recommendations are made for use of RT in treatment of meningioma. (12 Refs)

8. INTERSTITIAL BETA-THERAPY OF CYSTIC CRANIOPHARYNGIOMAS.

Volkov AA, Rogulov VA, Novikov AV, Kavalli BK
A. L. Polenov Res. Neurosurgical Inst., Leningrad, USSR
Med Radiol (Mosk); 27(1):42-46 1982

The efficacy of interstitial radiotherapy was evaluated in 35 patients (18 men, 17 women; 6-38 yr old) with cystic craniopharyngiomas. Clinical manifestations of the disease included endocrine disorders, vision disorders caused by stenosis of the optic chiasm and optic nerve, and intracranial hypertension. The patients received a transcerebral injection of radioactive colloids (24 received 198Au, 9 received Cr32PO4, and 2 received 131I-MAA); total dose to the cyst wall was 20,000-40,000 rads. Twelve patients received interstitial radiotherapy alone and 23 received radiotherapy in combination with surgery. Remission or improvement of the clinical state were observed in 29/35 patients. Of 35 patients, 26 died within less than 3 to 18 yr after the treatment (av duration of the survival was 61 mo), and 9 were alive at the time of reporting (av duration of the follow-up was 86 mo). (13 Refs) (In RUS)

9. MEDULLOBLASTOMA IN ADULTS: IMPROVED SURVIVAL WITH SUPERVOLTAGE RADIATION THERAPY.

Kopelson G, Linggood RM, Kleinman GM
31 Country Club Road, Peabody, MA, 01960
Cancer; 49(7):1334-1337 1982

During the period from January 1962-June 1979, 17 adults (greater than or equal to 16 yr of age) received postoperative supervoltage neuraxis radiation therapy for medulloblastoma. An actuarial 5-and 10-yr survival rate of 46% was achieved,

and the major site of recurrence postirradiation was in the posterior fossa. Compared to previous pediatric series, adults may demonstrate more visceral metastases and fare less well after tumor recurrence. Compared to prior series of adult patients, the demonstrated improved survival is attributed to increased doses delivered to the posterior fossa. (Author abstract) (30 Refs)

10. ASSESSMENT OF THE LONG-TERM EFFECTS OF PRIMARY RADIATION THERAPY FOR BRAIN TUMORS IN CHILDREN.

Danoff BF, Cowchock S, Marquette C, Mulgrew L, Kramer S
Dept. Radiation Therapy and Nuclear Medicine, Hosp. Univ. Pennsylvania, Philadelphia, PA, 19104
Cancer; 49(8):1580-1586 1982

One-hundred-twelve children with primary brain tumors received definitive radiotherapy between the yr 1958-1979. Sixty-nine patients were alive at intervals of 1-21 yr. Thirty-eight patients underwent neurologic and endocrine evaluation, psychologic and intelligence testing, and assessment for second malignancy post-treatment. A second intracranial malignancy developed in one child, for an incidence of 1.6%. Performance status was good to excellent in 89% of the patients studied. Seventeen percent of the group were mentally retarded. Behavioral disorders were identified in 39% of the patients, 59% of the mothers, and 43% of the fathers. Of the 23 patients with nonparasellar tumors, 6 were found to ha ve growth hormone deficiency, including 2 patients with panhypopituitarism. Disability was related to age under 3 yr at the time of treatment and tumor extension to the hypothalamus. (Author abstract) (33 Refs)

DIGESTIVE NEOPLASMS

11. RESULTS OF DIFFERENT VARIANTS OF RADIOTHERAPY OF ESOPHAGEAL CANCER.

Goldobenko GV
Res. Inst. Medical radiology, Obninsk, USSR
Med Radiol (Mosk); 27(2):17-21 1982

The efficacy of different variants of radical radiotherapy was evaluated in 297 patients with esophageal cancer (254 men, 43 women; 40-70 yr old). All patients were in Stage T3NxM0 or T4NxM0; majority of the patients (72%) had involvement of the middle thoracic region of the esophagus. The patients were divided into five groups. Group 1 included 70 patients who received rotational orthovoltage roentgenotherapy (single dose 150-200 rads, total dose 5,000-7,000 rads). The patients in Groups 2-5 received gamma therapy. The single and total dosages in Group 2 (38 patients) were as in Group 1. Group 3 (105) received split-course gamma-therapy (200 rads/day, 5x/wk, ip to 3,200 rads, then 400 rads, qod, up to 2,800-3,000 rads). Group 4 (64) received split-course gamma-therapy (200 rads/day, 6,200-7,100 rads, with 1-3-wk interval after 3,000-3,500 rads). Group 5 (20) received irradiations as in Group 3 and metronidazole during the second stage (150 mg/kg, 4 hr prior to irradiation). Complete or greater than 50% tumor regression was observed in 66.3% of the patients (54.3% in Group 1, 52.6% in Group 2, 72.4% in Group 3, 67.2% in Group 4, and 100% in Group 5). An overall 1-yr survival was 44.2% (87.5% in Group 5, 68.8% in Group 4, and 29-40% in Groups 1-3). (10 Refs) (In RUS)

12. INTRALUMINAL RADIATION FOR ESOPHAGEAL CANCER: A HOWARD UNIVERSITY TECHNIQUE.

Moorthy CR, Nibhanupudy JR, Ashayeri E, Goldson AL, Espinoza MC, Nidiry JJ, Warner OG, Roux VJ
Dept. Radiation Therapy, Howard Univ. Hosp., 2041 Georgia Ave., N.W., Washington, DC, 20060
J Natl Med Assoc; 74(3):261-266 1982

The objective of radiotherapeutic management in esophageal cancer is to accomplish maximum tumor sterilization with minimal normal tissue damage. This sincere effort is most often countered by the differential in tumor dose response vs normal tissue tolerance. Intraluminal isotope radiation, with its inherent advantage of rapid dose falloff, spares the lungs, the spinal cord, and other vital structures, yet yields adequately high doses to esophageal tumor. Though in existence since the turn of the century, the method of intracavitary radium bougie application dropped out of favor due to technical difficulties imposed by the size of the radium source and radiation exposure to the personnel involved. The authors describe a simple 'iridium 192 afterloading intraluminal technique' that eliminates technic al problems and reduces radiation exposure considerably. (Author abstract) (6 Refs)

13. INDICATIONS FOR AND RESULTS OF HIGH ENERGY RADIATION IN THE PRE- AND POSTOPERATIVE TREATMENT OF CANCER OF THE RECTUM.

Catterall M
Hammersmith Hosp., London, England
Ann Gastroenterol Hepatol; 18(1):13-17 1982

Radiotherapy of rectal neoplasms with the aid of x-rays, electrons, or neutrons is reviewed. High energy radiation is performed to sterilize regional lymph nodes; to shrink the primary tumor; as an alternative to surgery (especially for tumors in the lower rectum); to treat inoperable, recurrent, or residual tumors; and to palliate symptoms. Adequate preoperative radiotherapy reduces tumor size and usually sterilizes lymph nodes. The best results have been obtained using doses of 6,000 rads given during a period of 6 wk. Complications constitute the radiation dose-limiting factors. Radiation is of less benefit after surgical excision because of the reduction in blood supply and the wide and usually ill-defined vol of potential recurrence. Radiation has been found to make some inoperable tumors operable. Palliative radiotherapy has been reported to relieve pain, tenesmus, mucus discharge, and bleeding in some cases. Fast neutrons and results of neutron therapy are described. (8 Refs)

14. COMBINED RADICAL RADIATION THERAPY AND CHEMOTHERAPY FOR PRIMARY SQUAMOUS CELL CARCINOMA OF THE ANAL CANAL.

Cummings BJ, Rider WD, Harwood AR, Keane TJ, Thomas GM, Erlichman TC, Fine S
Dept. Radiation Oncology, Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Cancer Treat Rep; 66(3):489-492 1982

Radical radiation therapy (5,000 rads in 20 fractions in 4 wk) combined with iv mitomycin (10 mg/m2) and 5-fluorouracil (1,000 mg/m2/24 hr for 4 days) was used to treat 13 patients with locally advanced but operable squamous cell carcinoma of the anal canal. All patients achieved local control and retained anal continence, and none developed metastases. The patients were followed from 4 to 34 mo (median, 12). Severe acute gastrointestinal toxic effects were seen in three patients;

the same patients had significant thrombocytopenia or leukopenia. Treatment with this combined program may allow conservative management of squamous cell carcinoma of the anal and should be considered as an alternative to abdominoperineal resection. (Author abstract) (11 Refs)

15. INTRAOPERATIVE IRRADIATION FOR UNRESECTABLE PANCREATIC CARCINOMA.

Wood WC, Shipley WU, Gunderson LL, Cohen AM, Nardi GL

Surgical Services, Dept. Radiation Medicine, Cox Center, Massachusetts General Hosp., Boston, MA, 02114

Cancer; 49(6):1272-1275 1982

Twelve patients with localized, unresectable, pancreatic carcinoma were treated with a combination of external photon beam and intraoperative electron beam irradiation. Eleven tumors arose in the head and one in the body of the pancreas. Chemotherapy was administered to 6 of the 12 patients. Of the 11 patients who received both intraoperative and external beam irradiation, 4 were alive without evident disease. The median survival is 15+ mo. This pilot study demonstrates the feasibility of combining external beam and intraoperative therapy in a general hospital setting with no operative deaths, a brief postoperative stay, and no wound infections. The late complications of irradiating gastric antrum and duodenum are discussed. (Author abstract) (9 Refs)

GENITOURINARY NEOPLASMS

16. RESULTS OF PREOPERATIVE TELECOBALT IRRADIATION OF MALIGNANT RENAL TUMORS.

Eberhardt HJ, Strietzel M, Raatzsch H, Schorcht J, Hackel W, Kelly U, Voigtmann L

Radiologische Klinik, Medizinische Akademie 'Carl Gustav Carus', Fetschestr. 74, DDR-8019 Dresden, E. Germany

Radiobiol Radiother (Berl); 22(6):717-725 1981

The results of preoperative and postoperative telecobalt irradiation (PRE-TCI and POS-TCI, respectively) were compared in patients (57% men and 43% women, av age 56 yr) with malignant renal tumors. Tumors were Stage T1 (2%), T2 (8%), T3 (72%), or T4 (19%), with 0-2 lymph node metastases and no distant metastases. Hypernephroid carcinomas accounted for 91% of the cases. Short-term PRE-TCI (4 x 5 Gray on 4 successive days) was administered to 100 patients. Procedures involved regular consultation between urologists and radiologists, supervoltage radiotherapy, renal angiography, and preliminary transperitoneal ligature of renal blood vessels. POS-TCI (28 x 1.8 Gray, 5x/wk, total dose 50 Gray) was administered to 100 patients. Observation of 44 POS-TCI patients and 30 PRE-TCI patients lasted 5 yr. The 5-yr survival rate (5ysr) for both groups was 59%, compared with previously reported 31%. The difference was attributed to close cooperation between urologists and radiologists and to exact angiographic diagnosis. The 5ysr was 55% for POS-TCI patients and 67% for PRE-TCI patients. This difference was not significant. Telecobalt irradiation combined with neutron therapy produced a higher 5ysr (75%) than telecobalt irradiation alone (64%). (9 Refs) (In GER)

17 COMBINED PRE- AND POSTOPERATIVE ADJUVANT ADIOTHERAPY FOR BLADDER CANCER.

Mohiuddin M, Strong GH, Mulholland SG

Thomas Jefferson Univ. Hosp., 11th and Walnut St., Philadelphia, PA, 19107

Urology; 19(2):135-138 1982

Thirty-nine patients with invasive bladder cancer were treated using a new approach to adjuvant radiation therapy. All patients had histologic evidence of bladder muscle invasion on biopsy and were considered suitable for surgical resection. Low-dose preoperative radiation (500 rad) was delivered either on the day of or the day before cystectomy. In most instances, a radical cystectomy was perfor med and patients were then stratified according to pathologic stagings. Those patients with pathologically good prognostic indicators, Stage B1 low grade (I or II) disease, were followed up with no further treatment. Patients at high risk for local recurrence and pelvic lymph node involvement, Stages B1 high grade (III or IV), B2, and C, were given aggressive postoperative radiation (4,500 rad in 5 wk). Patients with advanced disease, Stage D2, were given palliative therapy. All patients received the dose of preoperative radiation as planned. Preliminary results indicate that combined pre- and postoperative radiation in bladder cancer gives excellent local control of disease. A significant potential for improved long-term survival of patients has been observed. (Author abstract) (19 Refs)

18. PROSTATIC CARCINOMA. EFFICACY OF INTERSTITIAL RADIOTHERAPY.

Reddi RP

Dept. Radiology, St. Joseph Medical Center, 3600 East Harry, Wichita, KS, 67218

J Kans Med Soc; 83(2):61-65,82 1982

Biopsy findings, complications, and survival following treatment of prostatic cancer with 125I is described for 39 patients (31 white, 8 black; 49-83 yr old), none of whom had metastatic disease according to bone marrow aspiration. Patients received 13-44 125I seeds each, implanted into prostate tissue via needles inserted into the organ after completion of pelvic lymph node dissection. Doses within the prostate ranged from 20,000 to 30,000 rad, delivered during 1 yr; the dose decreased to 5% at 2.0 cm. Six patients had positive pelvic lymph nodes and were treated with 6,000 rads (tumor dose) external radiation therapy. Follow-up needle biopsy was performed at two different sites at intervals of approx 12 and 24 mo. The study suggests that 125I seed implantation may be superior to total prostatectomy or external radiation therapy in terms of quality of survival, and is equally effective in prolonging life. External radiotherapy increased morbidity without increasing survival or lengthening disease-free interval. 125I seed implant and pelvic lymphadenectomy has the following advantages: accurate staging, favorable local control, satisfactory survival, low morbidity and mortality rates, shortened hospital stay in most instances, accurate dose adapted to tumor size and shape, and preservation of the functional integrity of pelvic organs. (18 Refs)

19. SEMINOMA OF THE TESTIS: RESULTS OF TREATMENT AND PATTERNS OF FAILURE AFTER RADIATION THERAPY.

Thomas GM, Rider WD, Dembo AJ, Cummings BJ, Gospodzrowicz M, Hawkins NV, Herman JG, Keen CW
Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 8(2):165-174 1982

Outcome of surgical and radiation therapy in 444 patients with histological diagnosis of pure seminoma (SE) treated in a single institution is reviewed to define the factors which predict tumor relapse (TR), and to analyze the sites of TR in relation to the treatment. Eighty-nine percent of patients had a radical inguinal orchidectomy (ORD), 14% had some scrotal surgery consisting of trans-scrotal biopsy, drain site or ORD, and 6% had a laparotomy. The staging distribution of patients is presented (76.1% Stage I, 19.4% Stage II, 4.7% Stage III). The 5-yr actuarial survival rate for all patients was 87%, 94% for Stage I, 74% for Stage II, and 35% for Stage III patients. Scrotal surgery at the time of primary treatment in Stage I patients did not predispose to disease recurrence in the abdomen, pelvis, or scrotum. Twenty-seven patients with Stage II disease developed recurrent SE; 10 of these were cured with further irradiation at the time of recurrence. Patients with a palpable mass (Stage IIB) had a greater chance of recurrence in the mediastinum, abdomen, and in distant visceral sites; uncontrolled abdominal disease was a significant problem for these patients. Disease did not recur in the mediastinum and supraclavicular fossa alone in any of the 40 Stage IIA patients. Numbers of Stage III patients surviving according to the distribution of disease at presentation are shown. Patients who presented with mediastinal and supraclavicular disease, but without palpable abdominal or visceral disease, 5/6 were cured with irradiation. In patients presenting with palpable abdominal masses in addition to mediastinal and supraclavicular disease, 2/6 were cured with irradiation. None of the eight patients with visceral disease was cured with irradiation. (21 Refs)

20. RADIATION THERAPY OF TESTICULAR NON-SEMINOMAS.

van der Werf-Messing B, Hop WC
Rotterdamsch Radio-Therapeutisch Instituut, Groene Hilledijk 301, 3075 EA Rotterdam, The Netherlands
Int J Radiat Oncol Biol Phys; 8(2):175-178 1982

Value of the primary radiotherapeutic approach was assessed in 121 patients with non-seminomatous germ cell tumors (NST) in various stages. Subgroups that might benefit from an initially combined modality treatment were identified according to stage and histology. Staging included laboratory tests for chorionic gonadotrophins and alpha fetoprotein. Extent of the disease was classified according to the Tumor, node, and metastasis-classification. At diagnosis significantly more patients in the malignant teratoma undifferentiated (MTU)-group were in a more advanced stage than patients in the malignant teratoma intermediate (MTI)-group. A routine dose of 4,000 rad was given to the target area in a period of approx 4 wk, by 5 fractions/wk. Actuarial survival rates were lower for both groups with increasing lymph node involvement (LNI); for most LNI-categories, patients with MTI had a better prognosis. The risk of pulmonary relapse (PR) was considerably higher in the MTU-group. In case of positive lymph angiography (LAG) the risk of PR was higher than with negative LAG for both MTI- and MTU-group. The group with a low risk of PR was composed of patients with either testis involvement or involvement beyond tunica albuginea, and a negative LAG; PR was approx 9% for both MTI- and MTU-groups. All other groups according to site involvement had a risk of PR of approx 50%. The significant risk difference between the total MTI- and MTU-groups is the result of a higher proportion of favorable patients in the MTI-group. (4 Refs)

GYNECOLOGIC NEOPLASMS

21. THE ROLE OF POSTOPERATIVE LOCAL OR REGIONAL IRRADIATION IN THE TREATMENT OF STAGE I OVARIAN CANCER.

Powlis WD, Mauch P, Ehrmann RL, Rose CM, Knapp RC, Bloomer WD
Royal Victoria Hosp., 687 Quest Avenue des Pins, Montreal H3A 1A1, Quebec, Canada
Radiology; 142(3):747-750 1982

Histological grade and cell type were major prognostic factors in a retrospective study of 63 patients with Stage I epithelial carcinoma of the ovary. Grading by architectural pattern seemed to predict relapse better than cytological grading. With serous, mucinous, and endometrioid cystadenocarcinomas, relapses increased with higher grades. Relapse occurred in none of 18 tumors of borderline malignancy. 2 of 27 (7%) with Grade I or II tumor, and 4 of 6 (67%) with Grade III. The upper abdomen and pelvis were both at risk. Because most recurrences were limited to the peritoneal surface in Grade III serous, mucinous, and endometrioid carcinoma, local and regional radiation therapy are justified; postoperative therapy is not recommended for borderline or Grade I tumors unless ascites or cytological evidence of peritoneal disease is present. Clear-cell carcinoma was uncommon and unfavorable; of 12 cases, 5 involved relapse, with 3 recurrences developing outside the abdomen. (Author abstract) (33 Refs)

22. VALUE OF MULTI-PLANAR CT IMAGES IN INTERACTIVE DOSIMETRY PLANNING OF INTRACAVITARY THERAPY.

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Int J Radiat Oncol Biol Phys; 8(2):295-301 1982

Application of multi-planar reconstructed computed tomography (MPRCT) and specific application to the treatment planning of intracavitary radium therapy (ICRT) for adenocarcinoma of the endometrium (ACE) are discussed. Demonstration case pertains to a 68-yr-old patient whose chief complaints were post-menopausal vaginal spotting for approx 5 mo. Diagnosis and clinical staging were ACE, clinical Stage II, Grade III. Radiation treatment (RT) comprised of whole pelvis external beam irradiation to a midline dose of 4,000/4 wk, followed by ICRT for 72 hr. Computed tomography (CT) scanning of the pelvis was done on whole body scanner prior to RT, during and after ICRT. Transaxial images and radiographic views are shown. Dose rates at estimated representative node-bearing sites from the technique of orthogonal radiographs are compared with the values obtained by the method of using MPRCT images. The differences in dose rates range from 0.1 to 2.5 rad/hr. Results reflect the displacement of the applicator, the more posteriorly location relative to the cervical os and the tandem, and hence closer to the rectum. Small lapses in the proper positioning of the ovoids and inadequate vaginal packing can result in significant increases in the bladder and

rectum dose rates. Major advantage of the MPRCT approach is in the display of dose rate distribution on CT images in multiple plains and the method presents substantially more dosimetry information for immediate clinical evaluation. (19 Refs)

23. A STUDY OF 333 PATIENTS WITH ADENOCARCINOMA OF THE ENDOMETRIUM TREATED BY COMBINED SURGERY AND RADIATION THERAPY (1958-1978).

Reboul F, Andine JP, Bossi G, Reboul G
Service de Radiotherapie, Clinique Sainte-Catherine, 84000 Avignon, France
Sem Hop Paris; 58(9):539-545 1982

Patient characteristics and combined radiosurgical treatment of women (34-92 yr old; mean age 63 yr) with endometrial cancer (204 Stage I, 40 Stage II, 24 Stage III, and 20 Stage IV) are described. Of the 333 patients, 274 were post-menopausal, 26 peri-menopausal, and 32 were premenopausal. Gynecologic and obstetric antecedents and associated diseases are described. Metrorrhagia was found in 224/333 patients. Hysterographic and lymphographic findings are presented. Of the tumors, 261 were well- and 31 medium-differentiated adenocarcinomas; 23 were totally undifferentiated. Premenopausal women had a better 5-yr survival rate (73.2%) as compared with peri-menopausal (59.9%) and post-menopausal (57.0%) women. The survival rates for patients with Stage I-IV cancers were 67.0%, 60.0%, 32.5%, and 10%, respectively. Survival rates for patients with well-, medium-, and undifferentiated tumors were 64.4%, 52.7%, and 5.9%, respectively. The 5-yr survival rate for 203 patients who underwent radiosurgery was 69.1%; for 85 patients considered inoperable and treated with radiotherapy alone, it was 35.2%. Best results were obtained when preoperative curietherapy, surgery, and postoperative radiotherapy were used (75 patients: 80.2% 5-yr survival rate). Of 45 patients treated for recurrence or metastasis, 35 were treated with surgery alone, 7 with radiotherapy alone, and 3 with radiosurgery. Treatment complications included cystitis (12 patients), simple rectitis (43), and minor accidents (55). Curative and palliative treatment of endometrial cancer is discussed. (11 Refs) (In FRE)

24. ANALYSIS OF RESIDUAL DISEASE FOLLOWING PREOPERATIVE RADIOTHERAPY VERSUS INITIAL SURGERY IN ENDOMETRIAL CARCINOMA.

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Int J Radiat Oncol Biol Phys; 8(2):213-218 1982

The correlation between the extent and location of residual tumor after pre-operative radiotherapy (RT) and the tumor grade, clinical and surgical stage and prognosis was studied in 107 patients with Stage I and II carcinoma of the endometrium; 67 patients (33 Stage I, 34 Stage II) received preoperative RT followed by surgery, while 40 patients (Stage I) had initial operation followed by postoperative RT. Histological grade and type, incidence of residual disease (RD) after preoperative RT, site of RD, depth of myometrial and vascular invasion, and clinical staging are presented. Seven of 67 patients and 3/40 patients developed recurrences and died of disease. Recurrences and death occurred in 24 mo (80%) in 8 of those 10 patients and all within 48 mo of treatment. In 16% of patients with RD were cancer related deaths compared to none in 22 patients without RD. The incidence of cancer related deaths was significantly higher in patients with extrauterine disease than in those with RD confined to the uterus. In the initial operation group, the frequency of cancer-related death in patients who had uterine disease only vs extrauterine disease were 3 and 50% respectively. Patients with Grade 3 tumors had significantly more RD, extrauterine spread, and cancer-related death compared to those with Grade 1 or 2. No comparable trends with stage of disease were noted. (10 Refs)

25. LONG-TERM FOLLOW-UP IN RADIATION THERAPY OF CARCINOMA OF THE VAGINA.

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Cancer; 49(6):1308-1315 1982

A retrospective analysis of 134 patients with histologically confirmed carcinoma of the vagina is reported. Actuarial disease free 5-yr survival was: Stage 0 (15 patients), 90%; I (39 patients), 90%; IIA (39 patients), 58%; IIB (21 patients), 32%; III (12 patients), 40%; IV (8 patients), 0%. Fifteen patients had carcinoma in situ; of these, 14 were controlled with interstitial or intracavitary therapy. Of 39 patients with Stage I carcinoma, 37 (95%) showed no evidence of vaginal or pelvic recurrence. Most of them received interstitial or intracavitary therapy or both; the addition of external beam irradiation did not significantly increase survival or tumor control. In Stage IIA (paravaginal extension) 22 of 34 (64.7%) patients were controlled with a combination of brachytherapy and external beam irradiation; only two of five (40%) treated with brachytherapy alone exhibited tumor control in the pelvis. Eight of 12 Stage III tumors were controlled in the pelvis. Only two of eight patients with Stage IV had no recurrence in the pelvis even with relatively high doses of irradiation. The dose of irradiation delivered to the primary tumor or the parametrial extension was critical in achieving successful results. The incidence of complications (9.7%) is correlated with the stage of the tumor and type of treatment given. (Author abstract) (19 Refs)

26. PLASMA PROSTAGLANDIN LEVELS IN RADIATION-INDUCED ENTERITIS.

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Int J Radiat Oncol Biol Phys; 8(2):275-277 1982

The plasma prostaglandin levels were examined in 17 patients (22-72 yr old, mean age 50.9 yr) with gynecologic malignancies selected to begin pelvic irradiation, and investigated whether the changes in the levels of circulating prostaglandins could account for the acute onset of diarrhea and associated gastrointestinal (GI) symptoms arising from radiotherapy. None of the patients had a history of GI disease or had taken medications within 1 wk of initiation of the study. All patients were given 900 rad tumor dose (TD)/wk in five fractions/wk for a total TD of 4,000 to 5,000 rad. The frequency of stools is presented. Thirteen patients (76%) reported three or more watery bowel movements/day. The max number of daily stools reported was seven. Nausea and vomiting were reported by six patients (35%) and intermittent colicky pain of varying intensity by nine (53%). Prostaglandin E (PGE), prostaglandin F (PGF), and 13,14-dihydro-15-keto PGF2alpha metabolite (PGF2aM) plasma levels are presented. Most of the mean PGE and PGF values were above the normal range. The mean PGF2aM values were remarkably constant during treatment ranging from 269-298 picog/ml and all were within normal range. No significant difference was observed among PGE, PGF, and PGF2aM obtained pre-treatment, during treatment,

or at 6 wk post-treatment. No correlation was observed between radiation dosage and prostaglandin levels. The distribution of values for PGE, PGF, and PGF2aM observed in the patients are presented. (7 Refs)

HEAD AND NECK NEOPLASMS

27. OCULAR ABSORPTION AND TOXICITY OF A RADIOSENSITIZER AND ITS EFFECT ON HYPOXIC CELLS.

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Arch Ophthalmol; 100(3):468-471 1982

The recurrence of retinoblastoma after radiation treatment may be related to hypoxic cell radioresistance. Radiosensitizing drugs acting on hypoxic cells without affecting the responses of oxygenated cells could improve treatment of ocular tumors while minimizing complications of radiotherapy. A desmethyl derivative of misonidazole is as effective a radiosensitizer as misonidazole (as measured in vitro) and is better suited to ocular administration, since it is more soluble than misonidazole. We studied the ocular toxic effects of a desmethyl derivative of misonidazole after subconjunctival administration of 140 and 70 mg. The higher dose produced an intolerable ocular toxic effect, but at the lower dose, the toxic effect was moderate and reversible. We compared ocular pharmacokinetics of the desmethyl derivative of misonidazole after subconjunctival and intravenous (IV) injections. Subconjunctival administration yielded vitreous and anterior chamber concentrations of the radiosensitizer sufficient to produce a notable dose-modifying effect (as high as 1.8 in the anterior chamber and 1.25 in the vitreous at 70-mg doses). In contrast, even at doses of 140 mg, IV injections of the desmethyl derivative of misonidazole did not result in therapeutically useful ocular levels. (Author abstract) (15 Refs)

28. DEFINITIVE RADIATION THERAPY FOR CHORDOMA AND CHONDROSARCOMA OF BASE OF SKULL AND CERVICAL SPINE.

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J Neurosurg; 56(3):377-385 1982

Proton-beam radiation therapy has been developed for the treatment of chordomas or sarcomas of bone or soft tissue that abut the central nervous system. The authors report the results of treatment of 10 patients, 6 with chordoma, 3 with chondrosarcoma, and 1 with a neurofibrosarcoma. Local control has been achieved for all patients (with, however, one marginal failure) with a follow-up period ranging from 2 mo to 6 yr. High doses of radiation, up to 76 Cobalt Gray Equivalents (CGE), have been delivered without significant morbidity. In particular, no neurological sequelae have been observed. (Author abstract) (12 Refs)

29. PROSPECT FOR THE TREATMENT OF THYROID CANCER WITH POST-OPERATIVE IRRADIATION.

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Taiwan I Hsueh Hui Tsa Chih; 80(11):1240-1252 1981

Between 1958 and 1980, 83 patients (61 females, 22 males) with thyroid cancer were treated with thyroidectomy and postoperative radiation therapy (RT); 63 were treated only with I131 and 20 with Co60 with or without I131 RT. RT was indicated in patients with postoperative residual lesions (17 patients), distant metastases (31), recurrent lesions (7), or those needing prophylactic treatment (28). The mean I131 dose for prophylactic, recurrent, residual, and metastatic lesions was 68, 121, 141, and 182 mCi, respectively. Forty-three patients were followed for 5 yr or more. Five and 10-yr survival rates were, respectively, 100% and 100% for the prophylactic group; 85.7 and 75%, for the recurrent group; 80% and 66.7% for the residual group; and 72.2% and 16.7% for the metastatic group. Five of eight deaths were due to metastatic thyroid carcinoma. Av survival from diagnosis to death was 3.5 yr (range, 6 mo to 9 yr). Use of I131 for treatment of distant metastases and for residual or recurrent tumors is recommended; postoperative irradiation may provide long-term palliation or may be curative in some patients. (11 Refs)

30. RANDOMIZED TRIAL OF CONVENTIONAL VERSUS HIGH FRACTIONAL DOSE RADIATION THERAPY IN THE TREATMENT OF ADVANCED HEAD AND NECK CANCER.

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Int J Radiat Oncol Biol Phys; 8(2):179-185 1982

The possibility of improving results of radiation treatment of advanced head and neck cancer by alteration in the fractionation of the radiation schedule was studied in 64 patients between 1973 and 1979. Thirty-one patients were randomized to receive 200 rad/day (Group A), and 33 were randomized to receive 400 rad/day (Group B). Twenty-six of the 31 patients of the Group A, and 30/33 of the Group B completed the treatment. The av age of patients was 62 yr in Group A and 66 yr in Group B. Majority of patients in both groups had Stage IV disease. A total dose to the primary lesion of approx 4,400 rad was administered to Group A patients; majority of Group B patients received a total dose of 6,600 rad. The av time from onset of treatment to max regression of the primary tumor was 7.5 wk in Group A and 5 wk in Group B. The av time for max nodal regression was 6.4 wk in Group A and 5.2 wk in Group B. Actuarial disease-free survival (DFS) for both groups is presented. The 5-yr DFS was approx 10% in both groups and showed no difference by statistical analysis. Wt loss occurred in 11 patients in Group A (6%) and in 11 patients in Group B (4%). In Group A peak mucosal reactions (PMR) were reached in wk 3 and 4 in the majority of patients, while in Group B mucositis reached max in most patients within 2 wk. PMR lasted for 2 wk or less in most patients in both groups; mucosal reaction was somewhat prolonged in Group A. Duration of epidermitis was equivalent in both groups. (29 Refs)

31. DOES PREOPERATIVE IRRADIATION INCREASE THE RATE OF SURGICAL COMPLICATIONS IN CARCINOMA OF THE HEAD AND NECK? A RADIATION THERAPY ONCOLOGY GROUP REPORT.

Marcial VA, Gelber R, Kramer S, Snow JB, Davis LW, Vallecillo LA
Radiation Oncology Div., Center for Energy and Environmment Res., Caparra Heights Station, San Juan, Puerto Rico
Cancer; 49(6):1297-1301 1982

This is a comparison of the rate of surgical complications in a group of patients with advanced but operable carcinoma of the head and neck who underwent surgery after preoperative radiotherapy (5,000 rad in 5 wk, 200 rad fractions, directed to the primary tumor area and neck) versus another group operated without prior irradiation. Both groups of patients formed part of a randomized prospective multiinstitutional trial of the Radiation Therapy Oncology Group (73-03). Of 229 patients who had planned operations, 88 (38%) developed some degree of surgical complications, and in 28 (12%) the complications were rated as severe. The most frequently reported complications were delayed healing and fistula formation each occurring in approx one-fourth of each of the two treatment groups. Carotid blow-out occurred in 5% or less of the cases. No significant statistical difference between treatment groups was noted for the overall complication rate or specific type of surgical complications. A trend was noted towards more complications in the preoperative group for patients with lesions in the oropharynx and supraglottic larynx. However, an opposite trend towards more complications in the no prior irradiation group was observed among patients with lesions in the oral cavity and hypopharynx. Surgical mortality and postoperative hospital stay were not significantly different between treatment groups. We conclude that preoperative irradiation for carcinoma of the head and neck, with the stated dose, followed by surgery in 4-6 wk, doses not substantially increase the rate of overall or specific type of surgical complications, surgical mortality or hospital stay versus those patients operated without prior irradiation. (Author abstract) (22 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

32. THE MANAGEMENT OF STAGE I-II HODGKIN'S DISEASE WITH IRRADIATION ALONE OR COMBINED MODALITY THERAPY: THE STANFORD EXPERIENCE.

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Dept. Radiology, Div. Radiation Therapy, Stanford Univ. Medical Center, Stanford, CA, 94305
Blood; 59(3):455-465 1982

At Stanford University, between 1968 and 1978, 230 patients with pathologic Stage I-II Hodgkin's disease were treated on prospective clinical trials with either irradiation alone or irradiation followed by six cycles of adjuvant combination chemotherapy. The actuarial survival at 10 yr was 84% for patients in either treatment group. Freedom from relapse at 10 yr was 77% among patients treated with irradiation alone and 84% after treatment with combined modality therapy [p(Gehan) = 0.09]. Freedom from second relapse at 10 yr was 89% and 94%, respectively [p(Gehan) = 0.56]. Several prognostic factors were evaluated in order to identify patients at high risk for relapse or with poor ultimate survival after initial treatment with irradiation alone. Systemic symptoms, histologic subtype, age, and limited extranodal involvement (E-lesions) did not affect the prognosis of patients and failed to identify patients whose survival could be im proved by the routine use of combined modality therapy. Patients with large mediastinal masses (mediastinal mass ratio greater than or equal to 1/3) had a significantly poorer freedom from relapse when treated with irradiation alone than when treated initially with combined modality therapy [45% versus 81% at 10 yr, p(Gehan)=0.03]. The 10-yr survival of these patients, however, was not significantly different (84% versus 74%). The implications of these observations on the management of patients with early stage Hodgkin's disease are discussed. (Author abstract) (34 Refs)

33. HODGKIN'S DISEASE: TREATMENT WITH LOW DOSE RADIATION AND CHEMOTHERAPY.

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Front Radiat Ther Oncol; 16:122-133 1982

After staging laparotomy and splenectomy, 48 children with Hodgkin's disease were given low-dose radiotherapy (RT: 1,500-2,500 rads according to bone age) and six cycles of MOPP therapy (nitrogen mustard, vincristine, procarbazine, and prednisone). Prednisone was omitted if mantle RT was given. Involved-field RT was given to Stage IA and IIA patients, total lymphoid RT (TLR) to Stage IB-IIIsA patients, and maintenance MOPP to Stage IV patients with bone marrow involvement (IVm). Booster RT (3,000-3,500 rads) was given to 159 nodal sites (not overlying the axial skeleton) which did not regress completely after RT and/or MOPP therapy. One of these nodal sites recurred after 18 mo and regressed after further RT; the patient remained recurrence-free (NER) thereafter. Two Stage IVm patients failed to respond to treatment and died within 6 mo. The other 46 patients were alive and 45/46 were continuously NER after a median of 3 yr. A few patients remained NER and showed no detectable developmental abnormalities after 10 yr of follow-up. The early side effects of treatment, including thyroid dysfunction in 4/24 children tested, were reversible and not severe. Shielding was applied to prevent RT damage to the heart, lungs, and gonads, apparently with success. The late effects of RT on bone growth were directly proportional to the dose and vol and inversely proportional to the patient's age at diagnosis. High-dose TLR led to a disproportionate change in sitting height as compared to standing height, especially in patients treated in early childhood (less than 6 yr old) or adolescence. The number of prepubertal boys was too small and the follow-up time too short to assess the effects of MOPP on testicular function. No second malignancies were noted during the follow-up period. (27 Refs)

34. PULMONARY RADIO-REACTION DEMONSTRATED BY X-RAY PICTURES. INTENSITY AND FREQUENCY OF ROENTGENO-MORPHOLOGICAL CHANGES OF THE LUNG AND MEDIASTINUM AFTER MANTLE-FIELD IRRADIATION WITH 4-MEV-PHOTONS AND SATELLITE TECHNIQUE.

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Radiologe; 22(2):74-82 1982

X-ray radiographs of 119 patients (5-69 yr old, median 28 yr, 62 males, 57 females) with Hodgkin's disease who received mantle-field irradiation between 1974-1979 as primary radiotherapy were analyzed retrospectively. Mediastinal lymphomas of different sizes were diagnosed in 72 (68%) patients. Stand-

ardized mantle-field irradiation with a 4-mega volt linear accelerator, extended-field satellite technique, and tumor doses of 40-46 Gray Units were administered. Results for the extent, frequency, and intensity of pulmonary radio-reaction (PRR), and factors that influence the degree of PRR are presented. After a latency period of approx 12 wk, four phases in the development of PRR could be distinguished: Phase I is the beginning of pneumonitis (PN), Phase IIa florid PN (wk 15), Phase IIb transition between florid PN and stationary lung fibrosis (wk 20), and Phase IV stationary paramediastinal lung fibrosis (wk 34). Only 14 patients (11.8%) had no characteristic changes after mantle-field irradiation. Changes in the apex of lung were observed in 78 patients (65.5%) and in 7 patients (5.9%) were observed changes in the vicinity of axilla. Patients with mediastinal lymphomas had significantly more severe radio-reactions (57%) comparing to those without mediastinal involvement (25%). Changes in peripheral parenchymal and mediastinal shadows after beginning of shrinkage (Phase IIb) were recurrences. (17 Refs) (In GER)

35. ROLE OF COMBINED-MODALITY THERAPY IN THE CURATIVE MANAGEMENT OF ADVANCED-STAGE 'FAVORABLE' NON-HODGKIN'S LYMPHOMAS.

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Cancer Treat Rep; 66(3):421-425 1982

Management of advanced stages of 'favorable' non-Hodgkin's lymphomas (NHL) is reviewed. NHL is characterized primarily by involvement of lymph nodes. Wide-field, high-dose radiotherapy (RT) has produced modest improvement in NHL. Some studies indicate that diffuse histiocytic lymphoma (DHL) in advanced stages can frequently be cured by combination chemotherapy (CCT). The 'favorable' types of NHL, nodular lymphocytic, poorly differentiated (NLPD), nodular mixed (NM), and diffuse lymphocytic, well differentiated (DLWD), show poor curability by available therapies. Current modes of treatment include initially deferred treatment, single-agent chemotherapy, (SACT), conventional high-dose RT, total-body RT (TBI), and combined modality therapy (CMT). Data for comparison of modalities is incomplete, preventing conclusive statements of effectiveness. Initially deferred treatment assumes that 'favorable' NHL is incu rable by available methods. Differences in response rates and overall survival using SACT and CCT are not clear. RT is limited by the usual requirement of prolonged treatment of bulky lymph node areas and the possibility of disease progression in unirradiated areas. Two studies indicate that high-dose, total lymphoid irradiation may be effective against Stage III nodular lymphoma. TBI apparently is of only palliative value. CMT may provide the best chance of curative treatment of 'favorable' NHL, since CCT and RT are not cross-reactive, and since recurrences after RT follow different patterns from those after CCT. Induction of complete CCT, followed by RT and then more CCT is suggested. (21 Refs)

36. TREATMENT OF MYCOSIS FUNGOIDES. TOTAL-SKIN ELECTRON-BEAM IRRADIATION VS TOPICAL MECHLORETHAMINE THERAPY.

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Arch Dermatol; 118(3):150-153 1982

Of 42 patients who had mycosis fungoides (MF) confined to the skin with or without dermatopathic lymphadenopathy, 21 were treated with topically applied mechlorethamine hydrochloride and 21 with total-skin electron-beam irradiation. The results of both therapeutic modalities are compared. We conclude that in the early stage of the disease, both forms of treatment are equally effective. In the later stages of MF, in the absence of lymph node or other systemic involvement, electron-beam irradiation seems to be superior in inducing an initial complete remission. However, because of the large number of patients who have a relapse after this therapy, it should be followed by topical mechlorethamine therapy. (Author abstract) (14 Refs)

37. WHOLE BONE MARROW IRRADIATION FOR THE TREATMENT OF MULTIPLE MYELOMA.

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Cancer; 49(7):1328-1333 1982

Nine patients with multiple myeloma were treated with whole bone marrow irradiation. Six had heavily pretreated disease refractory to chemotherapy. Three had stable disease lightly pretreated by chemotherapy. A modification of the 'three and two' total nodal radiation technique was employed. Although varying and often severe treatment related cytopenia occurred, infectious complications, clinical bleeding, and non-hematologic complications were minimal. Five of nine patients showed a decrease in monoclonal protein components, and one showed an increase during treatment. These preliminary results indicate that a reduction of tumor cell burden may occur in patients following whole bone marrow irradiation and that the technique is feasible. Whole bone marrow irradiation combined with chemotherapy represents a new conceptual therap eutic approach for multiple myeloma. (Author abstract) (15 Refs)

MUSCULOSKELETAL NEOPLASMS

38. FIFTEEN YEAR RADIOTHERAPY EXPERIENCE WITH CHONDROSARCOMA OF BONE.

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Int J Radiat Oncol Biol Phys; 8(2):187-190 1982

Effects of radiotherapy (RT) alone or in combination with other modalities were analyzed retrospectively in 20 patients (9 men, 11 women, 20-74 yr old) with chondrosarcoma of bone treated between 1961-1976. Thirteen tumors occurred in pelvic bones, 4 in vertebrae, 2 in distal femur, and 1 in maxillary antrum. RT consisted of supervoltage RT and/or neutrons. Eleven patients received RT alone, 3 patients received postoperative RT following less than radical local excision, 3 patients received RT with chemotherapy (CT) but without surgery, and 3 patients received RT for tumor recurrent after surgery. Results are presented; time intervals in mo were measured from the first day of RT. Typical tumor doses ranged from 4,000 to 7,000 rad at 1,000 rad/wk using parallel-opposed fields. The overall survival for RT alone is 54% at a median of 30 mo. CT and immunotherapy (cyclophosphamide, vincristine, adriamycin, dimethyl triazene imidazole carboxamide, chondrosarcoma lysates, and BCG scarification) were given after RT to a patients who was alive after 52 mo. Fifty-five

percent of the patients treated for cure showed no evidence of progressive local disease at an av time of 38 mo. Two additional patients were salvaged after RT failure, increasing the overall survival rate to 65%. Severe complications were observed in five patients; three patients developed foot drop, and surgery was performed in other two revealing viable tumor in both cases. (7 Refs)

39. THE GROWTH RATE OF BONE SARCOMAS AND SURVIVAL AFTER RADIOTHERAPY WITH TOURNIQUET-INDUCED HYPOXIA: A CLINICAL STUDY.

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Cancer; 49(8):1597-1604 1982

The volume doubling time of primary bone sarcomas and lung metastases was determined by measurements made on serial radiographs. For the primary tumors, the volume doubling times were log-normally distributed and varied in the range of 20-200 days with a mean around 50 days. The volume doubling times of the metastases also showed a log-normal distribution in the range of 10-100 days, but with a mean twice as short as that of the primaries. Radiation therapy was given with three-four doses of 20-25 Gy to the tumors that, together with the surrounding normal tissues, had been made hypoxic by the application of a tourniquet. Amputations were not performed unless required eventually by some serious late radiation dam age, such as grave functional deficiency, and/or painful fibrosis and ankyloses. In no case did microscopic examination of the amputated tissues reveal the persistance of any viable, neoplastic cells. The 5-yr survival of a total of 69 patients was 26%. Survival expectancy was found to be closely related to the volume doubling time of the tumors, as was the incidence of the metastases. The data stress the importance of volume doubling time as a predictive factor and indicate, furthermore, that treatment with a few massive radiation doses in combination with tourniquet-induced hypoxia is effective in local control of bone sarcomas. The severe late reaction of the normal tissues to the treatment will, however, require amputations in most of the 5-yr survivors. (Author abstract) (28 Refs)

40. RADIATION THERAPY TECHNIQUE IN SOFT TISSUE SARCOMAS OF THE EXTREMITY: POLICIES OF TREATMENT AT THE NATIONAL CANCER INSTITUTE.

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Int J Radiat Oncol Biol Phys; 8(2):263-273 1982

The rationale and technique of radiation therapy (RT) in adult soft tissue sarcomas (STS) of the extremities as practiced at the National Cancer Institute is discussed. Seventy-five patients with extremity lesions have been treated for local control with conservative surgery and RT between 1975 and 1980. Biology of STS, histological and surgical considerations, radiation technique (shrinking field technique, field shaping, field arrangement, immobilization, beam parameters, gonadal shielding, gapping techniques), and physical therapy are described. Although details of treatment vary greatly depending on the discussed parameters, a number of technical principles maximize the likelihood of local tumor control and of a good functional result. The four major anatomical regions affected by STS are the thigh, leg and foot, arm, and forearm and hand. The thigh is the most difficult in which to attain a high level of local control and the most likely to suffer morbidity; it is also the site with the highest likelihood to develop STS. Involvement of physical therapy in the care of the patient as early in the course of their disease, and ideally before their surgical procedure, is extremely important. This is essential for maintaining good long term function of the extremity. For patients with STS of the extremities the positioning of the patient, field arrangement, and beam shaping must be highly individualized to obtain optimal treatment results. (15 Refs)

41. IS THE MALIGNANT MELANOMA REALLY RADIOTHERAPY-RESISTANT?.

Storck H
Mittelbergsteig 7b, CH-8044 Zurich, Switzerland
Hautarzt; 33(1):5-11 1982

Radiation treatment of malignant melanoma (MM), results of MM radiation treatmen t since 1971, experiments with animal MM, MM radiosensitivity measured in in vitro experimental conditions, and possibilities of intensification of the radiation effect on MM are reviewed. The 5-yr survival rate from a collective study for 1,749 patients with MM Stage I is 67% for a single irradiation, 50% after surgery, 66% after radiation therapy and surgery, and 45% after radiation treatment following surgery. Difficulties in evaluation of MM treatment, with or without statistical interpretation, are due to the fact that single dose irradiation and fractionated irradiation are comparable only partially in their efficacy according to the duration and dosage of the fractions. The clinical radiosensitivity of human MM can be compared with the experimental hamster or mice melanoma, or with the sensitivity of cultured melanoma cells. Clinical experience, animal experiments, and culturing procedures revealed no evidence concerning the radiotherapy-resistance of MM. Application of the time-dosage-fraction (TDF) factors according to Orton and Ellis enables the comparison of biological effects for different TDF schedules. Electroaffine sensitizers, fast electrons, or neutrons with high linear energy transfer and small oxygen enhancement ratio could increase the efficiency of MM radiotherapy. (43 Refs) (In GER)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

42. THE ROLE OF RADIATION THERAPY FOR CARCINOMA OF THE LUNG.

Cox JD
Radiation Therapy, Medical Coll. Wisconsin, 8700 West Wisconsin Ave., Milwaukee, WI, 53226
Yale J Biol Med; 54(3):195-200 1981

A large proportion of patients with carcinoma of the lung may benefit from the use of radiation therapy. Operable patients have not been shown to benefit from preoperative irradiation, but postoperative irradiation has improved survival in those found to have involvement of hilar or mediastinal lymph nodes. Radiation therapy is the only potentially curative treatment for patients who are inoperable, but do not have distant metastasis. Control of the local tumor is very dependent upon dose-fractionation-time relationships. Patients who are relatively asymptomatic, ie, they have a high performance status, are curable if treated promptly with radiation therapy. Small cell carcinoma requires both radiation therapy and chemotherapy. The optimal method of combining the two modalities is yet to be determined, but prophylactic cranial irradiation is necessary

to control microscopic metastases that are not affected by systemic chemotherapy, and thoracic irradiation is necessary to give the highest probability of control of the primary tumor. Prophylactic cranial irradiation has also been shown to reduce the frequency of brain metastasis in patients with squamous carcinoma, large cell carcinoma, and adenocarcinoma; it may become more important in these cell types when more effective chemotherapy is developed. (Author abstract) (26 Refs)

43. LONG-TERM RESULTS OF THE RADIOTHERAPY OF PERIPHERAL SQUAMOUS CELL LUNG CARCINOMA.

Zhakov IG
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 27(1):46-49 1982

Long-term results of radiotherapy were evaluated in 83 patients (77 men, 6 women; 91.5% were greater than 50 yr old) with inoperable peripheral squamous cell carcinoma of the lung. Total focal doses ranged from 4,000-5,000 rads in 5 patients, to 5,000-7,000 rads in 64, and greater than 7,000 rads in 13. Of 83 patients, 23 were in Stage T1-2N0M0, 57 were in Stage T1-2N1M0, and 4 were in Stage T3N0-1M0. The 1-, 2-, 3-, and 5-yr survival rates were 70%, 29%, 12%, and 3%, respectively. The av duration of survival was 16.6 mo. The 1-yr survival in the patients who showed complete or greater than 50% tumor regression was 92%, compared with 50% in the patients who showed less than 50% tumor regression. The long-term results of the radiotherapy did not depend upon the tumor size: 1-yr survival in the patients with tumors less than 5 cm and greater than 5 cm in diameter was 70% and 71%, respectively. These findings indicate that the patients with large (7-8 cm in diameter) peripheral carcinomas should undergo radical radiotherapy. (10 Refs) (In RUS)

44. LARGE FRACTION RADIOTHERAPY PLUS MISONIDAZOLE FOR TREATMENT OF ADVANCED LUNG CANCER: REPORT OF A PHASE I/II TRIAL.

Simpson JR, Perez CA, Phillips TL, Concannon JP, Carella RJ
Washington Univ. Medical Sch., Mallinkrodt Inst. Radiology, 4511 Forest Park Blvd., Suite 311, St. Louis, MO, 63108
Int J Radiat Oncol Biol Phys; 8(2):303-308 1982

Phase I/II trial with misonidazole (MN) was conducted with 51 patients (36-77 yr old, 84% of patients 50 yr old or older, 35 males, 16 females) with locally advanced non-oat cell carcinoma of the lung to test drug and radiation tolerance, and efficacy in terms of local tumor clearance and relapse patterns. Distribution by stage and node involvement and distribution of histological types are shown. Most of the patients had epidermoid carcinoma (53%). Tumor dose of 3,600 rad was administered to patients in fractions of 600 rad 2x/wk. Each radiation treatment was preceded by 2 g/square meter (m2) MN administered po 4 hr before. MN dose was reduced subsequently to 1.75 g/m2. Forty-nine of 51 patients entered were considered evaluable. Objective responses were seen in 67% of patients; 18% showed a complete response of their primary tumor, and 49% a partial response. Patients were analyzed for toxicity either as a result of MN or radiation. Neurotoxicity appeared clearly dose related. Radiation tolerance was analyzed by degree and frequency of normal tissue reactions within the irradiated volume. Eight patients (16%) suffered significant esophageal morbidity with this drug and radiation schema. The patterns of relapse following therapy are shown. Twenty-nine patients have had identifiable patterns of relapse to date with a minimum follow-up time of 9 mo. Thirty-one percent of patients failed initially with distant metastases. Bone metastases were most common, occurring in 21% of patients. The median survival time of patients was 9 mo, with 34% of the patients alive at 1 yr. (20 Refs)

45. HEMATOPORPHYRIN DERIVATIVE AND LASER PHOTORADIATION IN THE TREATMENT OF LUNG CANCER.

Hayata Y, Kato H, Konaka C, Ono J, Takizawa N
Dept. Surgery, Tokyo Medical Coll., Shinjuku, Tokyo, Japan
Chest; 81(3):269-277 1982

Photoradiation (PRT) for 10-40 min 48 hr or more after iv injection of 2.5-4.0 mg/kg of hematoporphyrin derivative (HpD), was used for treatment of 13 patients with lung cancer and 1 with severely atypical squamous metaplasia. HpD was activated by visible red light (630 nanometers, 90-400 milliW) from an argon dye laser beam delivered by a quartz fiber inserted through the instrumentation channel of a fiberoptic bronchoscope. Of the 14 patients (11 men, 3 women; 38-74 yr old), 5 had well-differentiated squamous cell carcinoma, 1 poorly differentiated squamous cell carcinoma, 3 large cell carcinoma, 2 adenocarcinoma, 2 small cell carcinoma, and 1 severely atypical squamous metaplasia. The single patient (male, 74 yr old) with early-stage lung cancer refused surgery but showed complete regression of tumor and remained disease-free at 16 mo. In the 12 other cases of lung cancer, 18 foci were treated; at least partial response was observed in all cases and complete response was observed at 3 foci. Significant remission occurred in eight foci and the bronchi obstructed by tumor were opened in 4/8 patients; symptoms of dyspnea were relieved in these patients. No significant improvement in survival of these patients was noted; however, all were advanced stage cases. In the single patient with atypical squamous metaplasia, metaplastic atypia completely disappeared. The major side effect was skin photosensitivity, controlled by staying in the shade for 2 wk in 10 of the 11 patients with sunburn. (15 Refs)

46. THE ROLE OF THORACIC AND CRANIAL IRRADIATION FOR SMALL CELL CARCINOMA OF THE LUNG.

Cox JD, Holoye PY, Byhardt RW, Libnoch JA, Komaki R, Hansen RM, Kun LE, Anderson T
Div. Radiation Oncology, Medical Coll. Wisconsin, 8700 West Wisconsin Ave., Milwaukee, WI, 53226
Int J Radiat Oncol Biol Phys; 8(2):191-196 1982

Untreated patients with small cell carcinoma of the lung entered into one of the four successive studies performed at The Medical College of Wisconsin. To evaluate the role of chest and brain radiation therapy, effectiveness of chemotherapy (CT) combinations, points of complete response, and median survival (MS) in relationship to survival beyond the median, a retrospective review of the patients was undertaken. Patients in Study I were treated with thoracic irradiation (TI) alone, and CT with progression. Study II randomized patients to TI (3,000 rad in 10 fractions/2 wk) plus either total body irradiation (TBI) 100 rad in 10 fractions/2 wk with CT at progression vs immediate CT. CT consisted of cyclophosphamide, doxorubicin, and vincristine (CAV) iv on days 1 and 8 every 4 wk for 8 cycles. Study III evaluated the effectiveness of high dose CAV and administered prophylactic cranial irradiation (PCI); TI was withheld unless recurrence occurred or the response was incomplete. In Study IV, methotrexate-leukovorin (ML) was administered with CAV; PCI was as in Study III. Patients who responded completely received TI. Summary and comparison of the treatments in the studies are presented. In Study

II, TBI was ineffective as systemic therapy. In spite of a much higher proportion of patients with limited disease, the MS in Study I was 22 wk vs 48 wk for Study II. Study III showed that the high dose CAV was well tolerated and possibly more effective than lower doses, but no difference in MS was observed. Addition of ML to CAV in Study IV showed no apparent benefit compared to Study II and III. Detailed analysis of the ability of the various regimens to effect local control is presented. (21 Refs)

INSTRUMENTATION AND TECHNOLOGY

47. PRECISE POSITIONING OF PATIENTS FOR RADIATION THERAPY.

Verhey LJ, Goitein M, McNulty P, Munzenrider JE, Suit HD
Dept. Radiation Medicine, Massachusetts General Hosp., Boston, MA, 02114
Int J Radiat Oncol Biol Phys; 8(2):289-294 1982

Immobilization techniques devised for the use with a fixed horizontal proton beam which is being used for large field fractionated radiation therapy (RT) are discussed. Pretreatment verification of patient position is routine for proton therapy (PT) patients. For each of the studies performed, the patient was initially set up with a laser beam to a mark on the cast or the table for approximative alignment. In planning patients for PT, treatment positions consistent with the fixed horizontal beam were used; supine, seated, decubitus, and a modified supine position for submental fields. The techniques of immobilization and the distributions of observed intratreatment movements (ITM) for these positions are described. A comparison of pre- and post-treatment radiographs provided a measure of patient ITM. Each day supine patients were initially aligned using laser side-lights projected onto marks placed on the patients' masks. The total motion of the patient volume required between this initial laser alignment and the final pretreatment position is shown. The mean required motion is 2.2 mm +-1.4 mm. This represents the error that could be expected if the patient were aligned each day using only the laser, as is typical with high energy x-ray treatments. Less error would result if skin marks, rather than mask marks were used for this alignment. Even in the absence of pretreatment radiographs, the careful use of secure immobilization devices would be expected to achieve improvements in tumor control probability. (10 Refs)

PRE-CLINICAL STUDIES

48. EFFECT OF IRRADIATION WITH FAST NEUTRONS OR X-RAYS ON THE INCIDENCE OF METASTASIS OF TRANSPLANTED B16 MELANOMA IN MICE.

Furuse T, Kasuga T
Lab. Radiation Pathology, Natl. Inst. Radiological Sciences, 9-1, Anagawa 4-chome, Chiba 260, Japan
Gan; 73(1):35-41 1982

The effects of x-rays and fast neutrons on the incidence of metastasis of B16 melanoma were investigated. Tumors were irradiated with the iso-effect dose (380 rad of 2 MeV fast neutrons, and 1,900 rad of 200 kV x-rays) for regression and regrowth of the tumor, and then were excised 3 days after irradiation. Metastasis was examined macroscopically and microscopically in all organs and tissues of mice when death occurred or after sacrifice of surviving mice at 130 days after tumor inoculation. Metastasis was found in 16 to 22% of tumor-bearing mice irrespective of whether or not the tumor had been irradiated before excision. Almost all the mice with metastasis developed pulmonary metastasis accompanied by lymphogenous spread to the thoracic lymph node. The overall incidence of metastasis in the x- or fast neutron-irradiated mice was slightly but not significantly higher than that in the control mice. Irradiation significantly enhanced the incidence of metastasis when the tumor volume was smaller than 200 mm3, but not when the tumor volume was larger than 200 mm3. The incidence of metastasis was significantly enhanced in mice with tumors invading the muscle. The metastasis-enhancing effect of irradiation was noticeably greater with x-irradiation than with fast neutron irradiation in mice with localized tumor of B16 melanoma, whereas in mice with invasive tumors the effects were similar. (Author abstract) (14 Refs)

49. HEMOPOIETIC ACTIVITY IN BONE MARROW CHIMERAS PREPARED WITH TOTAL LYMPHOID IRRADIATION (TLI).

Slavin S, Seidel HJ
Dept. Medicine A, Hadassah Univ. Hosp., Jerusalem, Israel
Exp Hematol; 10(2):206-216 1982

The hemopoietic status was examined in the blood, bone marrow and spleen of (BALB/c x C57BL/6)F1 hybrid mice treated with fractionated total lymphoid irradiation (TLI), with or without reconstitution with 30 x 10(6) syngeneic or parental C57BL/6 marrow cells. Colony forming units of pluripotent (CFUS) and granuloid committed stem cells (CFUC) were assayed in non-irradiated (femur) and irradiated bone marrow (humerus), and in spleen 9, 18, 73 and 109 days following TLI. Recovery of CFUS and CFUC was nearly complete as early as Day 18, and fully recovered on Day 73 in endogenously as well as exogenously (syngeneic and semiallogeneic) reconstituted mice. Mice transplanted with C57BL/6 bone marrow exhibited a 10-fold increase of CFUC in the spleen on Day 9 and maintained a 4-fold increase of CFUC on day 109, with normal CFUC in shielded, and near normal CFUC in irradiated bones. In contrast, the number of CFUS in the irradiated humerus was below 10% of all controls on Days 18-73 and below 30% on Day 109. Also, the number of CFUS in the spleen was very much reduced at Days 73-109. Unirradiated femora contained normal CFUC and only mildly depressed CFUS. The data suggest that repopulation of bone marrow is adequate although somewhat less efficient in irradiated as compared to shielded bones, whether or not exogenous marrow is transplanted. Semiallogeneic chimeras (C57BL/6 becoming F1) show low CFUS relative to high CFUC levels, particularly in irradiated organs (spleen and humerus). This may suggest an advantage, from a hemapoietic standpoint, to selective irradiation of lymphoid tissues, rather than the less selective wide fields that overlap marrow containing bones. (Author abstract) (22 Refs)

50. PROTECTIVE EFFECTS OF S-2-(3-AMINOPROPYLAMINO)ETHYLPHOSPHOROTHIOIC ACID AGAINST RADIATION DAMAGE OF NORMAL TISSUES AND A FIBROSARCOMA IN MICE.

Milas L, Hunter N, Reid BO, Thames HD
Dept. Experimental Radiotherapy, M.D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
Cancer Res; 42(5):1888-1897 1982

S-2-(3-Aminopropylamino)ethylphosphorothioic acid (WR-2721) was investigated for its protective effect against radiation-produced damage of jejunum, testis, lung, hair follicles, and a fibrosarcoma of C3Hf/Kam mice. Most of these tissues were radioprotected, and the degree of radioprotection depended on the dose of WR-2721 and the time interval between administration of WR-2721 and radiation treatment. WR-2721 increased resistance of jejunal epithelial cells and spermatogenic cells to single doses of gamma-rays by factors of 1.64 and 1.54, respectively. Protection against hair loss was less pronounced; the dose-modifying factor here was 1.24. The radiation-induced acute damage of the lung expressed by the increased formation of tumor nodules in the lung was not decreased by treatment of animals with WR-2721 before radiation. In contrast, WR-2721 augmented the radiation-induced enhancement of metastasis formation in the lung. WR-2721 protected fibrosarcoma micrometastases in the lung against therapeutic effect of radiation by a factor of 1.28. In contrast, this compound has no effect on the therapy of an 8-mm fibrosarcoma growing in the legs of mice. (Author abstract) (29 Refs)

51. DIFFERENTIAL EFFECT OF HYPERTHERMIA AND X-IRRADIATION ON REGROWTH RATE AND TUMOUR-BED EFFECT FOR A RAT SARCOMA.

Wheldon TE, Hingston EC
MRC Cyclotron Unit, Hammersmith Hosp., Du Cane Road, London W12 0HS, England
Br J Cancer; 45(2):265-271 1982

The regrowth rate of the rat sarcoma SSB1a was assessed, following treatment with either x-rays of hyperthermia. The growth rate of untreated tumors implanted in pre-irradiated or pre-heated normal tissue was also measured For treatments giving similar levels of tumor regrowth delay, the regrowth of irradiated tumors was markedly slower than that of untreated tumors, whilst the regrowth rate of tumors subjected to hyperthermia did not differ from that of untreated tumors. The growth rate of untreated tumors implanted in pre-irradiated skin was also slower than that of control tumors, though the growth-rate reduction was less dramatic than for regrowth following tumor irradiation in situ. Tumors implanted in pre-heated skin grew at the same rate as control tumors. Slower regrowth in situ after x-rays than after hyperthermia would produce a larger growth delay for x-rays than for hyperthermia, for equal levels of tumor-cell kill or probability of tumor sterilization. This effect could lead to a systematic underestimation of the efficacy of hyperthermia relative to x-rays, when efficacy is assessed by growth delay. (Author abstract) (23 Refs)

52. STUDIES ON FRACTIONATED HYPERTHERMIA IN EXPERIMENTAL ANIMAL SYSTEMS II. RESPONSE OF MURINE TUMORS TO TWO OR MORE DOSES.

Urano M, Rice LC, Montoya V
Dept. Radiation Medicine, Massachusetts General Hosp., Harvard Medical Sch., Boston, MA, 02114
Int J Radiat Oncol Biol Phys; 8(2):227-233 1982

Kinetics of thermal resistance (TR) and fractionated hyperthermia regimen were studied in murine tumors induced in 10-12 wk old C3Hf/Sed mice. Assay methods include tumor growth (TG) time analysis and determination of 50% tumor control dose (TCD50). TCD50 is a treatment time at elevated temperature to yield a tumor control in half the treated animals. A spontaneous mammary carcinoma (MCA) and a chemically-induced fibrosarcoma (FSa-I) were used. MCA was treated with equal dose fractions at 43.5 C with a time interval (Ti) between treatments of 1, 2, or 5 days; then TCD50 was determined. TCD50 increased with increasing overall treatment time. Results suggest that the true TCD50 values after fractionated treatment might have been greater than those obtained experimentally with a resultant decrease in the therapeutic ratio. The kinetics of TR was studied at 45.5 C to investigate the different therapeutic ratio between MCA and FSa-I. The effect of Ti between first dose (D1) and second dose on the development of TR was studied in MCA. The dose-response curves after 2 doses demonstrated a less steep slope compared to single dose-response curve, indicating that substantial TR developed following the first exposure to heat. Effect of the siz e of D1 on the development of TR was studied for MCA and FSa-I by TG time analysis. The magnitude of TR appeared more dramatic in MCA than in FSa-I, in that a difference in slopes between single and 2 dose-response curves was far greater for MCA than for FSa-I. (34 Refs)

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service • National Institutes of Health • National Cancer Institute

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BREAST NEOPLASMS

1. EFFECTS OF SINGLE LARGE-DOSE PREOPERATIVE RADIOTHERAPY ON ADVANCED BREAST CANCER.

Mikuriya S, Konoeda K, Mikami A, Hatano K, Fujii K, Koga I, Kimura T, Adachi H, Kamimura S, Sagara M, Kato T, Oonishi M, Ooami H, Hidaka Y, Kudo T, Matsumura K
Div. Radiology, Natl. Medical Center Hosp., Japan
Nippon Gan Chiryo Gakkai Shi; 16(7):1468-1480 1981

Relatively advanced breast cancer was treated with single large-dose preoperative radiotherapy in 26 patients (29-84 yr old). The radiotherapy was administered with the aid of a betatron (6-20 million electron volt) apparatus and consisted of a single 30 Gray (Gy) dose in eight of the patients and of fractionated doses from 1-20 Gy (2-3x/2wk; total, 23-38 Gy) in the remaining patients. Three cases were Stage II, 18 were Stage III, 4 were Stage IV, and 1 was metastatic. Following the radiotherapy, 20/26 cases were resectable. Histopathological examination of the resected specimens indicated that marked cellular infiltrations of primary tumor nests occurred in 14/24 cases; this suggested a direct relationship between the irradiation and immune response. Abscopal effects were observed macroscopically in 7/20 cases and microscopically in 10/20. Enhanced immune response after the irradiation, was also shown in four kinds of skin tests for cellular immunity, although slight decreases were observed in rates of PHA-induced blastoid formation of lymphocytes in vitro and in numbers of peripheral lymphocytes and T cells. Single large-dose preoperative radiotherapy was thought to have positive effects on the host immune reaction and survival of the advanced breast cancer patients. (28 Refs) (In JPN)

CENTRAL NERVOUS SYSTEM NEOPLASMS

2. A COAXIAL CATHETER SYSTEM FOR AFTERLOADING RADIOACTIVE SOURCES FOR THE INTERSTITIAL IRRADIATION OF BRAIN TUMORS.

Gutin PH, Dormandy RH
Dept. Neurological Surgery, Editorial Office, Univ. California Sch. Medicine, 350 Parnassus Ave., Suite 807, San Francisco, CA, 94143
J Neurosurg; 56(5):734-735 1982

A coaxial two-catheter system that facilitates accurate stereotaxic placement of radioactive sources for the interstitial irradiation of brain tumors is described. (Author abstract) (3 Refs)

3. HUMAN CENTRAL NERVOUS SYSTEM DISTRIBUTION OF CIS-DIAMMINEDICHLOROPLATINUM AND USE AS A RADIOSENSITIZER IN MALIGNANT BRAIN TUMORS.

Stewart DJ, Leavens M, Maor M, Feun L, Luna M, Bonura J, Caprioli R, Loo TL, Benjamin RS
(c/o Benjamin) Dept. Developmental Therapeutics, M. D. Anderson Hosp., Houston, TX, 77030
Cancer Res; 42(6):2474-2479 1982

The human central nervous system pharmacology of cis-diamminedichloroplatinum (CDDP) was studied, and trials were initiated of CDDP as a radiosensitizer in the treatment of malignant primary brain tumors. Samples were assayed for platinum using x-ray-dispersive fluorescence spectrometry. Platinum concentrations in edematous brain tissue adjacent to tumor were generally lower than platinum concentrations in intracerebral tumor. Brain platinum concentration decreased with increasing distance from intracerebral tumor. The extent to which central nervous system pharmacology of an antineoplastic agent affects its activity against intracerebral neoplasms remains unclear. Fifteen patients with malignant brain tumors received CDDP, 40 mg/sq m/wk iv during cranial irradiation, and some received 105 to 120 mg/sq m every 3 wk after cranial irradiation. Close follow-up was necessary, and some weekly treatments needed to be omitted in individual patients. During the weekly CDDP, gastrointestinal, scalp, and renal toxicities and hypomagnesemia were noted but were tolerable. Only one patient developed myelosuppression. Ototoxicity may have been enhanced. Postirradiation CDDP, 105 to 120 mg/sq m every 3 wk, caused substantially more gastrointestinal toxicity and may have caused central nervous system toxicity in four patients, although other factors probably contributed. It is too early to evaluate effect on survival. (26 Refs)

4. MENINGIOMA AS A SEQUEL OF RADIOTHERAPY FOR PITUITARY ADENOMA.

Spallone A
Istituto di Neurochirurgia, Universita di Roma, Viale dell' Universita 30, 00185 Roma, Italy
Neurochirurgia (Stuttg); 25(2):68-72 1982

Meningioma was found in two patients after radiotherapy for pituitary adenoma. A 38-yr-old woman presented with decreasing vision and obesity. Chromophobic adenoma had been surgically treated 9 yr prior to presentation. Radiotherapy had been given postoperatively (2,500 R) and after recurrence 7 yr later (4,100 R in 18 fractions over 3 wk). Clinical examination showed increased body hair, severe visual impairment, bilateral optic atrophy, and temporal hemianopia. A small prefrontal lobectomy was followed by removal of a large, recurrent chromophobic adenoma arising from the sella. Following surgery symptoms improved. The patient was hospitalized 11 yr later for auditory hallucinations. Two yr later the patient presented with frontal headache, visual deterioration, and a tremor in the left hand. A fibroblastic meningioma was completely removed from the sella. A 35-yr-old woman presented with oligomenorrhea and acromegaly of 13 yr duration. Radiotherapy (4,000 R over 4 wk followed after 3 mo by 2,200 Rad over 2 wk) 12 yr prior to presentation had temporarily relieved the symptoms. X-rays showed an enlarged sella with erosion of the floor. An eosinophilic adenoma was removed by transsphenoidal microsurgery. The patient returned the following yr with headache and blurred vision. A fibroblastic meningioma was removed from the floor of the anterior fossa. Review of 192 cases of pituitary adenoma suggests a causal relationship between radiotherapy and subsequent development of meningioma. (59 Refs)

DIGESTIVE NEOPLASMS

5. THERAPY TRIAL WITH TELECOBALT IRRADIATION OF PATIENTS WITH ESOPHAGEAL CANCER.

Morysinski T, Starzynska T, Danczak-Ginalska Z
Zaklad Teleradioterapii, Instytut Onkologii, Warsaw, Poland
Pol Przegl Chir; (Suppl):43-45 1981

Forty-one patient with squamous epithelial carcinoma (34), solid carcinoma (5) and anaplastic carcinoma (2) of the esophagus were subjected to radical telecobalt radiotherapy (total

dose 5,000-7,000 rads in 35 days). Radiologically manifest local tumor regression was achieved in 95% of all patients. The av survival of the 41 patients was 19.7 mo. The 2-, 3-and 4-yr survival rates were 22.3%, 17% and 14.5%, respectively. Patients with tumors smaller than 5 cm and without distant metastases, and those irradiated with 6,000 rads, were found to benefit most from the radiotherapy. (no Refs) (In POL)

6. INTERSTITIAL PULMONARY INFILTRATE FOLLOWING COMBINED THERAPY FOR ESOPHAGEAL CARCINOMA.

Dunnick NR, Schwade JG, Martin SE, Johnston MR, Glatstein E
NIH, Building 10, Room BIN257, Bethesda, MD, 20205
Chest; 81(4):453-456 1982

Seven men (61-65 years old) with squamous cell carcinoma of the esophagus received 4,000 rad irradiation therapy in 10 equal doses over 5 weeks followed in 14-41 days by esophagogastrectomy. At operation lymph node metastases were discovered in six patients. Four of the patients developed progressive diffuse interstitial pulmonary infiltrates, three within 24 hours and one within 8 days of surgery. No pleural effusions, Kerley B lines, or infectious agent were found. There was no correlation of location of the pulmonary changes with the radiation ports. These four patients died of pulmonary insufficiency 18-50 days postoperation. Autopsy revealed widespread dilatation of interstitial and subpleural lymphatics, extensive organizing alveolitis, and interstitial fibrosis. The three remaining patients included two with no visible tumor at operation. One of these two was still in remission 20 months after presentation, and the other died with local recurrence 17 months after presentation. The third patient, with metastasis at operation, died with local recurrence at 11 months. None of 24 other patients receiving radiation therapy up to 4,800 rad in the same fashion with no surgery developed such pulmonary complications. (12 Refs)

7. THERAPY AND PROGNOSIS OF GASTRIC SARCOMA.

von Bulow M, Dzihniszewski G
Chirurgische Universitatsklinik, Langenbeckstrasse 1, D-6500 Mainz, W. Germany
Langenbecks Arch Chir; 356(2):129-140 1982

The treatment of 20 patients with gastric sarcomas and of 31 patients with gastric lymphomas is described. Undifferentiated sarcomas of the lowest level of tissue maturation (spindle-cell sarcomas) were diagnosed in 10/20 patients, differentiated sarcomas in 10 (liposarcoma in 1, neurogenic sarcoma in 5 and leiomyosarcoma in 4). Billroth's II resection was performed in five patients in Stage I and in three patients in Stage II, gastrectomy in five patients Stage II, wedge resection in one patient in Stage I, and exploratory laparotomy in six patients in Stage IV. The patients with sarcomas of low level of maturity were usually subjected to postoperative cytostatic therapy, and three patients were irradiated after surgery. Three patients in Stage Ib have been alive for more than 8 yr, while the 5-yr survival rate was lower than 50% in Stage Ic. The 5-yr survival rate was 0% in Stages II and III. Twenty-three of the 31 patients with malignant lymphomas were followed up. Seven of the 23 patients in Stages I and II were subjected to tumor resection with radiotherapy and chemotherapy; the mean survival time was 58 mo. Five other patients, subjected to tumor resection only, had an av survival time of 18 mo. the combination of chemotherapy and radiotherapy was also found to be definitely advantageous in the patients in Stages III and IV, in whom the diagnosis of lymphoma was usually established only postoperatively. (19 Refs) (In GER)

GENITOURINARY NEOPLASMS

8. PRIMARY TUMORS OF THE RENAL PELVIS AND URETER: VALUE OF POSTOPERATIVE EXTERNAL RADIOTHERAPY.

Nguyen TD, Franck D, Bugat R, Douchez J, Combes PF
Service de Radiotherapie, Centre Claudius Regnaud, 11, rue Piquemil, 31052 Toulouse Cedex, France
Sem Hop Paris; 58(11):661-664 1982

Twenty-four observations of primary malignant tumors of the renal pelvis and ureter derived from epithelial cells were included in this study. Thirteen patients were treated by radiotherapy and surgery. In 11 patients, surgical excision was the only treatment. Although patients were not randomized there was no significant difference between the two groups concerning the following parameters: age distribution, sex ratio, stage of disease, histological grade, surgical procedure. The morbidity related to external radiotherapy (megavoltage technique, delivering 45 grays in 5 wk) was low: only one patient developed retroperitoneal fibrosis. No patient was lost to follow-up. Local recurrence occurred in 54.5% of the patients treated by surgery alone, against 15.5% after combined radio-surgical therapy. The overall 3-yr survival rate was 35% without any significant difference between the two groups. The authors advocate postoperative high-voltage radiotherapy for non-disseminated carcinoma of the renal pelvis and ureter. (Author abstract) (9 Refs) (In FRE)

9. HYPERTHERMIC PERFUSION OF THE DISTENDED URINARY BLADDER IN THE MANAGEMENT OF RECURRENT TRANSITIONAL CELL CARCINOMA. A REVIEW AFTER 6 YEARS.

Newsam JE, Law HT
Dept. Urology, Western General Hosp., Edinburgh EH4 2XU, Scotland
Br J Urol; 54(1):64-65 1982

Results of treating 12 patients with intractable postradiotherapy bladder bleeding due to tumor (11) or telangiectasia (1) with hyperthermic perfusion are described. A new device for the application of local hyperthermia to body cavities is described for the treatment of patients who have intractable hematuria following radical radiotherapy for the management of recurrent transitional cell carcinomas and for patients with multiple T1 tumors unsuitable for diathermy and unresponsive to epodyl. (1 Ref)

10. PRELIMINARY OBSERVATIONS ON THE RESULTS OF COMBINED 125IODINE SEED IMPLANTATION AND EXTERNAL IRRADIATION FOR CARCINOMA OF THE PROSTATE.

Ross G, Borkon WD, Landry LJ, Edwards FM, Weinstein SH, Abadir R
Dept. Surgery, Div. Urology, Univ. Missouri Sch. Medicine, Columbia, MO
J Urol; 127(4):699-701 1982

Fifty-seven patients with localized carcinoma of the prostate were treated with pelvic lymphadenectomy and a reduced 125iodine implant dosage, supplemented by a moderate dose of external beam radiotherapy to the whole pelvis delivered 4-6 wk later. The incidence of pelvic nodal metastases was 28% and the operative morbidity was 15%. Late radiation sequelae developed in 18 patients, including 15 patients with radiation proctitis (29%), among whom 2 (4.6%) suffered rectal ulcer-

ation and required diverting colostomy. Followup has been 2 yr or longer (median 33 mo) in 26 patients, of whom 22 (85%) are free of disease. Three patients are living with osseous metastases or local disease and there has been one death of prostatic carcinoma, for an absolute 2-yr survival rate of 95%. Of the seven patients with poorly differentiated tumor and of the eight patients with positive pelvic lymph nodes 5 and 6, respectively, remain free of disease after a minimum 2-yr followup. Potency has been lost in 20% and reduced significantly in 30% of the patients followed 18 mo or longer. Prostatic biopsies on 28 asymptomatic patients 12-30 mo after completion of therapy showed no tumor in 21 (75%). (Author abstract) (9 Refs)

11. RADIOLOGIC THERAPY OF THE TESTICULAR SEMINOMA.

Heider KM, Salewski D
Radiologische Klinik, Martin-Luther-Universitat Halle - Wittenberg, Dryanderstrasse 4-7, DDR - 4020 Halle (Saale), E. Germany
Radiobiol Radiother (Berl); 23(1):7-14 1982

One hundred thirty-one patients with histologically diagnosed seminoma were divided in two groups after radical semicastration. Group A consisted of 58 patients who were administered radiotherapy (RT) to bilateral aortic, inguinal and iliac lymph nodes. Group B consisted of 73 patients who were administered RT as in Group A, when they were in Stage I and additional RT to mediastinum and to the left supraclavicular region when they were in Stage II and Stage III. The seminoma was located in the right testicle in 65 of the patients, in the left testicle in 64, and retroperitoneal in 2. Time span between symptoms and diagnosis was 7.6 mo, and between surgery and RT 1.8 mo. Of the 131 patients, 77 were in Stage I (No M0), 25 in Stage II (N1-3 M0), and 29 were in Stage III (N4 M0) and they were divided equally between Group A and Group B. After 3 yr, 79% of the patients in Group A were free of relapse, and 99% in Group B. (14 Refs) (In GER)

12. TESTICULAR SEMINOMA: A REVIEW OF 30 CASES.

Laverdiere J
Centre d'onco-radiologie, Hotel-Dieu de Quebec, Pavillon Carlton-Auger, Quebec, Canada
Union Med Can; 110(10):905-906 1981

A retrospective analysis of 30 patients (20-58 yr old) with testicular seminomas (1 spermatocytic, 4 anaplastic, and 25 classic) treated with radiotherapy is presented. Lymphatic metastasis, particularly involving the para-aortic lymph nodes, and secondarily the iliac, supra-clavicular, and mediastinal lymph nodes, are most common. Diagnostic technics include lymphography, pyelography, tomography, and evaluation of diagnostic markers (alpha fetoproteins and beta subunit of human chorionic gonadotropin). Patients were classified as Stage I (18 patients), II (8), or III (4). Stage I patients were treated with cobalt60 radiotherapy (2,500 rad in 3 wk) to the para-aortic region. In Stage II patients, extra radiation (1,000-1,500 rads) also was delivered to known lymphatic masses along with prophylactic mediastinal and sub-clavicular radiotherapy (2,500 in 3 wk). Stage III treatment varied. The overall 3-and 5-yr recurrence-free survival rates for the 30 patients was 85% and 84%, respectively. Rates for Stage I patients were 92% and 91%, respectively. Rates for Stage II patients were 80% and 71%, respectively. In Stage II patients, recurrences usually observed in the abdomen and lungs were treated with radiotherapy and chemotherapy (alkylating agents and adriamycin). (no Refs) (In FRE)

13. PRIMARY RETROPERITONEAL SEMINOMA.

Buskirk SJ, Evans RG, Farrow GM, Earle JD
Div. Therapeutic Radiology, Mayo Clinic, 200 First St. SW, Rochester, MN, 55905
Cancer; 49(9):1934-1936 1982

In a retrospective review (1950-1975) of the Mayo Clinic experience with seminomas (483 cases), 12e patients (2.5%) were found to have a retroperitoneal seminoma without evidence of testicular involvement. The mean age was 47 yr (range, 31-67). Eleven patients were treated by radiation alone, with doses ranging from less than 2,000-5,800 rads. Seven patients are alive with a median follow-up of 6 yr. The median survival of the five that died is 10 mo. Good prognostic factors are typical histopathology and an encapsulated tumor. Poor prognostic factors are atypical histopathology, a nonencapsulated tumor, a symptomatic abdominal mass and a nonfunctioning kidney at the time of diagnosis. Although the review includes few patients, it seems reasonable to suggest irradiation of the tumor bed and paraaortic lymph nodes to a minimum dose of 2,000 rads. Prophylactic treatment of the mediastinum and supraclavicular lymph nodes should be considered if one or more of the poor prognostic factors are present. (Author abstract) (19 Refs)

GYNECOLOGIC NEOPLASMS

14. RADIATION TREATMENT OF CARCINOMA OF THE CERVIX WITH EXTENSION INTO THE ENDOMETRIUM. A REAPPRAISAL OF ITS SIGNIFICANCE.

Prempree T, Patanaphan V, Viravathana T, Sewchand W, Cho YK, Scott RM
Dept. Radiation Therapy, Univ. Maryland Hosp., 22 South Greene St., Baltimore, MD, 21201
Cancer; 49(10):2015-2020 1982

During the period from 1969-1974, 561 patients with proven invasive squamous cell carcinoma of the cervix were treated by irradiation only in the Department of Radiation Therapy, University of Maryland Hospital. Of these, 82 patients were identified as having D and C positive for squamous cell cancer present in the curettings with or without endometrial tissue. Clinical staging was done using FIGO guidelines and the treatment of endometrial extension was the same as with regular cervical cancer. Of 82 cases who are eligible for a minimum 5-yr follow-up, the absolute 5-yr survival is as follows: Stage I, 68% (17/25); Stage II, 62% (18/29); Stage III, 40% (10/25); Stage IV, 0% (0/3). The most interesting features are the local and distant failures in Stage I and II disease. Local failure in Stage I and II in this study is in line with other series. Distant metastasis, however, occurs at the rate of 20% in Stage I between 1-2 yr after treatment (as compared to the control of 5%). In Stage II, the distant disease increases to 24% with a substantial number of local failure with distant metastasis. Based on our findings and others, it seems appropriate to suggest D and C be done routinely in order to identify the extension of cancer into the endometrium and treat them properly. Also it appears appropriate to re-examine our policy of the treatment to minimize both local and distant failures with suggestions outlined in Schema I and II along with possibility of a future chemotherapeutic management to minimize the distant disease. (Author abstract) (15 Refs)

15. SCINTIGRAPHY IN EVALUATION OF INTESTINAL ABSORPTION OF FAT DURING RADIOTHERAPY OF CERVIX CANCER.

Modnikov OP
Kirgiz Res. Inst. Oncology and Radiology, Frunze, USSR
Med Radiol (Mosk); 27(2):74-76 1982

The intestinal assimilation and hydrolysis of fat was studied in 97 patients with carcinoma of the uterine cervix. The profile scanning method was used before, during, immediately after and 6-12 mo after telecobalt therapy (total tumor dose 8,000-10,000 rads). Nine patients were in Stage I, 46 in II, 21 in III and 2 in IV. Twenty-seven practically healthy women served as controls. Fat assimilation and hydrolysis were not impaired before radiotherapy compared with controls, but considerable decrease in the rate of resorption and increase in the time necessary for 50% resorption were observed after administration of half the total dose. These changes reached their maxima immediately after administration of the total radiation dose, but there were no significant differences in the impairment of assimilation and hydrolysis. Considerable but incomplete restoration of fat resorption and hydrolysis was observed 6-12 mo after radiotherapy. The improvement in fat hydrolysis was less marked than that in assimilation. (13 Refs) (In RUS)

HEAD AND NECK NEOPLASMS

16. FACTORS AFFECTING THE SURVIVAL OF PATIENTS WITH NASOPHARYNGEAL CARCINOMA.

Hsu MM, Lynn TC, Hsieh T, Huang SC, Tu SM
Dept. Otolaryngology, Natl. Taiwan Univ. Hosp., Taipei, Taiwan
Taiwan I Hsueh Hui Tsa Chih; 80(12):1296-1306 1981

Nasopharyngeal carcinoma (NPC) is considered to be characteristic for Chinese of the southern China. In order to study various factors, (including age, sex, pathological classification and staging) influencing survival, computer analysis of survival data were undertaken in 1,555 patients (1,177 males, 378 females; 4-77 yr old). Actuarial survival rates from life tables were used. All patients were followed, some for up to 11 yr, with a follow-up rate of 92.5%. Pathologically all case were verified to be epidermoid carcinoma or undifferentiated anaplastic carcinoma. They were treated primarily by radiotherapy. The overall 1-, 2-, 5-and 10-yr survival rates were 82.7%, 67.4%, 47.8% and 39.8%, respectively. Females generally had better prognosis than males, especially in those 40 to 59 yr old. In males, younger patients had better prognosis whereas in females age was not a significant prognostic factor. Patients with cervical excisional biopsy before radiotherapy and those with residual tumors at the nasopharynx and/or neck region after radiotherapy had poor prognosis. Pathological classification did not significantly influence the prognosis of NPC patients while clinical staging did. (28 Refs) (In CHI)

17. NASOPHARYNGEAL ANGIOFIBROMA: RADIATION VS SURGERY.

Fahey DJ, Buolos EJ, Dayem HA, Alker G
Otolaryngology Dept., State Univ. New York at Buffalo, Buffalo, NY
Ear Nose Throat J; 61(4):233-237 1982

Juvenile nasopharyngeal angiofibroma (JNA), despite its benign histology, can be a highly destructive bone disease which sends tumor processes throughout the nasal cavity. Diagnosis of JNA was made in a 14-yr-old boy by computed tomography of the head, nasopharyngoscopy and transnasal biopsy. Since the tumor was not readily resectable, radiation was the therapy of choice. The patient received 200 rads daily to a total of 4,000 rads in 20 increments over a period of 27 days. JNA is a slowly regressing tumor and a mass was still detected in the nasopharynx and sphenoid sinus until 20 mo post-therapy. The patient was free of disease 33 mo postirradiation with normal facial maturation and symmetry. When JNA is treated with radiation, treatment doses and ports must be planned individually to cover total tumor mass while protecting radiosensitive structures. Arguments against radiation therapy for JNA are presented; among the most dangerous long-term complication is carcinogenesis with two such cases reported in patients who received doses greater than 9,000 rads. (18 Refs)

18. CARCINOMA OF THE TONSILLAR REGION. RESULTS OF EXTERNAL IRRADIATION.

Tong D, Laramore GE, Griffin TW, Russell AH, Tesh DW, Taylor WJ, Martenson JA

Dept. Radiation Oncology, NNIIO, Univ. Washington, Univ. Hosp., RC-8, 1959 N.E. Pacific St., Seattle, WA, 98195

Cancer; 49(10):2009-2014 1982

A retrospective analysis is made of 104 patients treated with photon megavoltage radiotherapy for squamous cell carcinoma of the tonsillar region during the period 1965-1975. Moderately differentiated squamous cell carcinoma was the most common histological grade. Fifty-three per cent of the cases presented with cervical lymphadenopathy with three cases of bilateral involvement. The 3 yr local control rate was 100% for Stage I, 74% Stage II, 49% Stage III, and 33% Stage IV. Two Stage III cases and one Stage IV case developed subsequent contralateral neck disease. No patient with either T1N0 or T2N0 tumor failed in the ipsilateral or contralateral neck despite the fact that 42% of the T1N0 cases and 37% of the T2N0 cases were treated with unilateral portals. The prognostic significance of the T and N stages, treatment techniques, as well as dose response relationships are analyzed and the literature is reviewed. (Author abstract) (20 Refs)

19. TUMORAL RECURRENCE IN CARCINOMA OF THE LIP: SALVAGE RETREATMENT BY CURIETHERAPY.

Nguyen TD, Douchez J, Combes D, De Lafontan B, Daly N, Combes PF

Institut Jean Godinot, 1, ru du general Koenig, BP 171, 51056 Reims Cedex, France

Ann Radiol (Paris); 25(3):207-209 1982

Authors record 31 observations of local recurrences arising from squamous cell carcinoma of the lip and retreated by curietherapy. Comparison is made between this failure group (Group I) and a series of 116 patients simultaneously treated by curietherapy (Group II), with a curative intent. Tumoral recurrences occurred in 16 cases after external radiotherapy, in 11 cases after surgery, and in 4 cases after curietherapy. Clinical staging reveals a 30% incidence of T3 T4 among Group I patients while only a 7% incidence is observed in Group II patients. Nevertheless, local salvage by curietherapy is obtained in 90% of all cases. Patients referred for treatment of local recurrence present a threefold rate of later cervical metastatic nodes (30%, 6 patients/31). Survival is not modified but cosmetic results are seriously aggravated after re-treatment with constant fibrosis. (Author abstract) (5 Refs) (In FRE)

20. POSSIBILITIES AND LIMITATIONS OF RADIOTHERAPY IN TREATMENT OF THYROID CANCER.

zur Horst-Meyer H, Correns H-J
Geschwulstklinik des Bereiches Medizin (Charite), Humboldt-Universitat zu Berlin, Schumannstrasse 20-21, 1040 Berlin, E. Germany
Z Aerztl Fortbild; 76(1/2):15-17 1982

Patients with thyroid cancer (TC) were evaluated. The most important factor in the biological evaluation was the histological type, followed by the age of patient, spreading of the TC, lymph node involvement, metastases, and Iodine-metabolism determined by 131I uptake by the thyroid stimulating hormone. Treatment of TC consisted of removal of whole gland, followed 14 days later with radioactive-I therapy until salivary gland region gave double amount of impulses compared with the surrounding tissue when using scintigraphy. Percutaneous irradiation of lymph paths in the neck was performed 14 days later as a treatment of the enlarged lymph nodes (since surgical removal of such lymph nodes does not improve results of surgery). Hormone substitution treatment was radioactive-triiodothyronine. Patients with inoperable TC were treated with aggressive irradiation therapy. This treatment was administered regularly since 1974. Good results and repeatedly long survival were observed. Number of patients and time span were too short to publish the results. (15 Refs) (In GER)

21. CHILDHOOD RHABDOMYOSARCOMAS OF THE HEAD AND NECK: 2 CASE REPORTS ON SALIVARY GLANDULAR AND PARAGLANDULAR INVOLVEMENT.

Daou RA, Schloss MD
(c/o Schloss), 2300 Tupper St., Montreal, P.Q., H3H 1P3, Canada
J Otolaryngol; 11(1):52-56 1982

Rhabdomyosarcoma is reviewed and two new cases of glandular and paraglandular rhabdomyosarcoma seen and treated at the Montreal Children's Hospital (MCH) are presented. Of 48 cases of rhabdomyosarcoma encountered at MCH within the last 32 yr, 20 involved the head and neck. The cases presented include those of a 7-yr-old male with parotid rhabdomyosarcoma and a 5-yr-old male with submandibular paraglandular rhabdomyosarcoma. Both patients were successfully treated using surgical excision followed by radiotherapy and chemotherapy. This multimodal therapy has proved superior to any single therapy and has eliminated the need for mutilating surgery. Current drugs of choice for chemotherapy are vincristine, actinomycin D, cyclophosphamide, and adriamycin. Radiotherapeutic dose varies depending on patient age and diagnosis, although patients less than 3 yr old do not receive a total dose of greater than 4,000 rad. Supervoltage irradiation is used in 200 rad fractions 5 days/wk. Follow-up of both patients showed no recurrences of metastasis. (20 Refs)

22. FIRST RESULTS OF FAST NEUTRON THERAPY FOR ADVANCED HEAD AND NECK CANCER IN KRAKOW.

Skolyszewski J
Instytut Onkologii, Garcarska 11, 31-115 Krakow, Poland
Radiobiol Radiother (Berl); 23(1):15-19 1982

Cyclotron using U120 as the source of fast neutrons (av energy of 5.5 Megavolts) was used in the therapy of 49 patients with advanced cancer of the head and neck. Twenty-eight of the patients (1 man, 27 women; 27-74 yr old) who received only fast neutron therapy were observed for at least 1 yr. A well differentiated cancer was histologically diagnosed in all the patients who were considered inoperable, (advanced disease or poor general state of health). Five patients had the tumor located in tongue, six in oropharynx, seven in pharynx, four had recurrent tumors in pharynx after surgery, two below the pharynx, two in the major salivary glands, and two had metastases. Radiation dosage was 1056-1519 rad administered in 16-23 sessions. Skin reactions consisted of erythema and desquamation. Mucosal reaction was severe in two patients. One patient had to interrupt the therapy and the other died, because of general sepsis and cardiac failure. A few mo after the therapy, five of the patients developped necrosis and one of them died. After 1 yr, nine of the patients were living free of the disease, although the therapy was considered only palliative. (14 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

23. EFFECT OF INDUCTION RADIOTHERAPY-CHEMOTHERAPY AND SPLENECTOMY ON LYMPHOID SUBCLONES IN PATIENTS AFFECTED WITH HODGKIN'S LYMPHOMA IN COMPLETE REMISSION.

Leoni P, Montroni M, Montillo M, Salvi A, Centurioni R, Fanciulli E
Istituto di Patologia Speciale Medica e Metodologia Clinica, Universita di Ancona, Ancona, Italy
G Clin Med; 62(10):685-692 1981

Forty-nine patients with Hodgkin's lymphoma had complete staging, together with determination of T, B, and total lymphocytes. Such evaluations were made at the time of diagnosis, after induction therapy, approx 1 yr later (36/49), 2 yr later (23/49), and 3 yr later (17/49). Laparotomy and splenectomy were performed on 27 of the patients. According to clinical or pathological staging, three patients were Stage I, 25 were Stage II, 15 were Stage III, and 6 were Stage IV. Symptoms were present in 19 of the patients and absent in 30. Histologic types included nodular sclerosis (31), mixed cellularity (8), lymphocyte depletion (5), and lymphocyte prevalence (3). Treatment consisted of radiotherapy and chemotherapy MOPP (mustine, oncovin, prednisone, and procarbazine). No maintainance therapy was administered. Basic immunological deficits of the patients were worsened by the induction therapy. Total and T lymphocyte values recovered after 2 yr and, after 3 yr, were above basic values. B lymphocyte values were somewhat depressed by the induction therapy but recovered rapidly. Except for the T lymphocyte values, lymphocyte values of the patients that underwent splenectomy were always above those of the non-splenectomized patients. (14 Refs) (In ITA)

24. THE ROLES OF STAGING LAPAROTOMY, CHEMOTHERAPY, AND RADIOTHERAPY IN THE MANAGEMENT OF LOCALIZED DIFFUSE LARGE CELL LYMPHOMA: A STUDY OF 75 PATIENTS.

Lester JN, Fuller LM, Conrad FG, Sullivan JA, Velasquez WS, Butler JJ, Shullenberger CC
(c/o Fuller) Dept. Radiotherapy, Univ. Texas M. D. Anderson Hosp., 6723 Bertner Ave., Houston, TX, 77030
Cancer; 49(9):1746-1753 1982

A retrospective study of 75 laparotomy-studied Stage I and II patients with diffuse large cell (histiocytic) lymphoma was conducted to determine the relative contributions of laparotomy, radiotherapy, and combination chemotherapy to their management. The treatment programs were radiotherapy alone, radiotherapy followed by adjuvant chemotherapy, and

alternating chemotherapy-radiotherapy. Treatment selection was based on disease presentation, with limited therapy used for favorable patterns and intensive therapy used in prognostically unfavorable settings. Disease-free survival was best in those treated with initial chemotherapy, even though these patients comprised the least favorable prognostic group. A select subset of patients, those with extranodal head and neck disease, obtained good results with radiotherapy alone, but for other presentations this was not a successful approach. Differences in results for the three treatment programs are discussed in relation to future treatment decisions. (Author abstract) (33 Refs)

25. NON-HODGKIN'S LYMPHOMA IN THE GASTROINTESTINAL TRACT.

Melsom H, Rode L, Kaalhus O, Elgjo RF, Langholm R, Marton P
Alminnelig avdeling, Det Norske Radiumhospital, Montebello, Oslo 3, Norway

Tidsskr Nor Laegeforen; 102(6):374-377 1982

Primary non-Hodgkin's lymphoma of the gastrointestinal tract was diagnosed in 61 patients. Lymphosarcoma was found in 20 patients, reticulosarcoma in 32 and unclassifiable lymphoma in 9. According to the Kiel classification, lymphocytic lymphoma was diagnosed in 2 patients, lymphoplasm cytoid lymphoma in 22, centrocytic lymphoma in 2, centroblastic/centrocytic lymphoma in 18, lymphoblastic lymphoma (including Burkitt's lymphoma) in 8, immunoblastic lymphoma in 4, and unclassifiable lymphoma in 4. Pains, weight loss, emesis and nausea were the most frequent symptoms. The disease was diagnosed in most patients within 3 mo from the onset of the first symptoms The tumor was localized in the stomach in 31 patients, in the small intestine in 15, in the large intestine in 5, in the ileocecal region in 4, and in the mesentery in 6. Thirty patients were in Stage I, 31 in II. Eleven patients (10 in Stage I and 1 in II) were subjected to surgery only, 19 (including 10 in Stage I) to surgery and radiotherapy, 31 (including 10 in Stage I) to surgery, radiotherapy and cytostatic therapy. The 5-yr survival rate was higher than 60% for the patients with gastric lymphomas, but lower than 25% for those with tumors of other localization in the intestine. The 3-yr survival rate was 9/11 after surgery only. The 5-yr survival rate was 13/19 after surgery with postoperative radiotherapy and 3/31 after surgery with radiotherapy and cytostatic therapy. Surgery with postoperative radiotherapy was found to be most effective in patients with limited disease. (10 Refs) (In NOR)

26. UNUSUAL FORM OF MYCOSIS FUNGOIDES; SUCCESS OF RADIOTHERAPY.

Flerens F, Bourlond A, Guilmot-Bruneau MM, Saussez-De Temmerman A
Service de Dermatologie, Faculte de Medecine, Universite catholique de Louvain, 52, avenue E. Mounier, Tour Vesale, B-1200 Bruxelles, Belgium

Dermatologica; 164(2):101-103 1982

Mycosis fungoides of the nose in a 76-yr-old man disappeared slowly after the administration of 6,500 rad to the base of the nose and 5,500 to the ridge of the nose. The lesion, 5 x 3 cm in size and 0.5 cm in depth, had developed over a period of 2-3 yr and was resistant to local corticosteroid therapy. No adenopathies or extensive invasion were noted. The unusual site, the isolation of mycosis fungoides lesions, and the exceptionally favorable results obtained are noted. (no Refs) (In FRE)

MUSCULOSKELETAL NEOPLASMS

27. THE USE OF A SHORT DISTANCE COBALT UNIT IN THE TREATMENT OF PRIMARY SKIN TUMOURS.

Holmes ME, Bomford CK, Phil M
Weston Park Hosp., Whitham Road, Sheffied S10 2SJ, England

Br J Radiol; 55(651):225-228 1982

Over an 8-year period 167 patients with primary skin tumors in difficult treatment sites have been treated using a short distance cobalt unit. The advantage of this unit over conventional superficial therapy is the lower absorption of radiation in underlying bone and cartilage. The local failure rate of 5% for basal cell carcinomas and 12% for squamous cell carcinomas is acceptable, and, of the remaining cures, there have been no problems with local necrosis and all have a good functional result. (Author abstract) (5 Refs)

28. X-RAY TREATMENT OF SKIN CANCER: SHORT FRACTIONATION TECHNIQUE.

Shelmire DS
8226 Douglas Ave., Suite 549, Dallas, TX, 75225

Cutis; 29(4):345-347 1982

Five patients with squamous cell and 46 patients with basal cell carcinoma were followed for 1-5 years after treatment with three doses of 1,000 rad of x-radiation in a 5-10 day period. All tumors were greater than 1 cm in size. Sites included head, neck, eyelid, nose, but not ear (prescribed at this fractionation). Recurrence was seen in two patients after 1 year and in three patients after 2 years; two of the recurrences involved patients already in recurrence after surgical removal. Limitation of this short fractionation to patients greater than 60 yr old, is recommended. (5 Refs)

29. CONVENTIONAL RADIOTHERAPY IN THE TREATMENT OF LENTIGO MALIGNA AND LENTIGO MALIGNA MELANOMA.

Harwood AR
Dept. Radiation Oncology, Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario, Canada

J Am Acad Dermatol; 6(3):310-316 1982

Conventional fractionated radiotherapy (RT) was given to 40 patients (12 men, 28 women, 30-96 yr old; 37/40 were greater than 60 yr old) with lentigo maligna (LM: 17/40) or lentigo maligna melanomas (LMM: 23/40), usually of the face (32/40). Local tumor control was complete in all patients. Two residual tumors and two local recurrences were successfully treated by surgery (3/4) or repeat RT (1/4). LM regressed completely within 3-15 mo (av, 7 mo); LMM regressed completely within 1-24 mo (av, 8 mo). No regional or distant recurrences developed. The duration of complete remission was 2-5 yr in 13/40 patients (6/13 with LM, 7/13 with LMM) and 7-13 yr in 2/40 (1/2 each with LM and LMM). The cosmetic results of RT were excellent. It is concluded that conventional fractionated RT is a simple and effective outpatient treatment for LM and LMM. (11 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

30. SEQUENTIAL CHEMOTHERAPY AND RADIOTHERAPY MODALITIES IN SMALL CELL LUNG CARCINOMA. PRELIMINARY RESULTS.

Le Chevalier T, Arriagada R, Pico JL, Rouesse J, Hayat M, Duroux P, Baldeyrou P, Homasson JP

Institut Gustave-Roussy, rue Camille-Desmoulins, F-94805 Villejuif Cedex, France

Bull Cancer (Paris); 69(1):98-101 1982

Two non randomized therapeutic trials have been conducted in oat cell carcinoma of the lung with limited disease. The first protocol combined chemotherapy (adriamycin, cyclophosphamide, VM 26, procarbazine) with mediastinal and supra-clavicular radiotherapy in classical fractionation (40 grays in 4 wk). The second combined a more intensive chemotherapy (adriamycin, VP 16, methotrexate, cyclophosphamide) with an alternating radiotherapy (3 series of 15 grays). All patients received prophylactic brain irradiation. Preliminary results show a 9 mo survival rate of 34% and 62.5% respectively. In addition, all patients in the second protocol presented a complete response at the end of the induction treatment. These preliminary data encourage proceeding with this kind of combined treatment. (Author abstract) (7 Refs) (In FRE)

31. EXTENSIVE DISEASE SMALL CELL CARCINOMA OF THE LUNG. TRIAL OF NON-CROSS RESISTANT CHEMOTHERAPY AND CONSOLIDATION RADIOTHERAPY.

Dillman RO, Taetle R, Seagren S, Royston I, Koziol J, Mendelsohn J

Div. Hematology/Oncology, VA Medical Center VIIIE, 3350 La Jolla Village Dr., San Diego, CA, 92161

Cancer; 49(10):2003-2008 1982

Twenty-nine patients with extensive disease, small-cell carcinoma of the lung, were treated with two cycles of intensive combination chemotherapy: HexaVAC (hexamethylmelamine, vincristine, adriamycin, cyclophosphamide). Responders received prophylactic cranial radiation (2,000 rad/10 fractions) and non cross resistant chemotherapy via a schedule of alternating cycles of CMV (cyclophosphamide, methotrexate, VP-16-213) and AMV (Adriamycin, methotrexate, VP-16-213). Whenever a complete response was achieved, consolidation radiotherapy was given to the lung primary (4,000 rad/20 fractions, split dose) and abdominal metastases (2,000 rad/10 fractions) synchronous with CMV therapy. The complete response rate was 14% with HexaVAC, but increased to 38% during CMV/AMV. Total response rate (complete and partial) was 59% and median survival was 42 wk. Prophylactic brain radiation prevented clinical relapse in the brain in all 14 patients who received it. However, consolidation radiotherapy failed to prevent clinical relapse in the lung and/or liver, and therapeutic brain radiation (3,000 rad) failed to prevent relapse in that site. The simultaneous administration of radiotherapy and chemotherapy was well-tolerated although two patients with poor performance status died of infectious complications while leukopenic. In spite of the high response rate, durable remissions with prolonged disease free survival were rare. Further evaluation of induction, consolidation, and maintenance modes of therapy are indicated. (Author abstract) (21 Refs)

32. INDICATIONS FOR RADIOTHERAPY BEFORE AND AFTER SURGERY IN BRONCHIAL CARCINOMA.

Meyer H

Servico de Cirurgia Toracica, Hospital Raphael de Paula Souza, Curicica - RJ - TCBC, Brazil

J Pneumol; 7(1):7-8 1981

Indications for radiotherapy (RT) before and after surgery in bronchial carcinoma were considered. Although the use of RT as a treatment is being disputed, RT is widely administered. Effect of RT depends on the histologic type of the bronchial carcinoma. RT is indicated before surgery to reduce spreading and after surgery when the mediastinal lymph nodes were involved. (9 Refs) (In POR)

INSTRUMENTATION AND TECHNOLOGY

33. THE DOSIMETRIC PROPERTIES OF AN APPLICATOR SYSTEM FOR INTRAOPERATIVE ELECTRON-BEAM THERAPY UTILIZING A CLINAC-18 ACCELERATOR.

McCullough EC, Anderson JA

Div. Radiation Therapy, Dept. Oncology, Mayo Clinic/Foundation, Rochester, MN, 55901

Med Phys; 9(2):261-268 1982

A prototype electron applicator system providing circular and rectangular fields for use in intraoperative electron beam therapy with a Varian Clinac 18 linear accelerator has been fabricated. The dosimetric properties of this system for a variety of electron-beam energies, applicator sizes, and x-ray collimator settings was documented. Significant findings include: (a) surface dose values are in excess of 90% for electron energies of 12 MeV and above; (b) for the 18-MeV beam, the deepest depth where the central axis dose is 90% of its maximum value is in excess of 50 mm for the circular applicators whose diameters are in excess of 5 cm; and (c) the treatment time to deliver 1,000 rads 'given dose' (at a given dose rate of 300 Mu/min) is on the oder of 3-4 min. Cross-field behavior is acceptable for the intended application and x-ray contamination is less than 4% for any applicator/electron energy combination. A system for irregular field blocking and TLD verification dosimetry has been developed. (Author abstract) (4 Refs)

34. A MICROCOMPUTER-BASED SYSTEM FOR RADIOTHERAPY BEAM COMPENSATOR DESIGN AND PATIENT CONTOUR PLOTTING.

Andrew JW, Aldrich AE

Cancer Treatment and Res. Foundation Nova Scotia, Victoria General Hosp., Halifax, Nova Scotia B3H 2Y9, Canada

Med Phys; 9(2):279-283 1982

A microcomputer-based system for radiotherapy beam compensator design has been constructed. The patient surface measuring device which projects a grid pattern on the patient is attached to the collimator of a therapy treatment simulator. A linear motion potentiometer, pivoted at one end on a ball joint attached to the collimator, is extended to touch each grid point in turn. The extension of the potentiometer is monitored by a microcomputer which calculates the coordinates of the patient's surface as each grid point is entered. A template for compensator construction is subsequently printed on the microcomputer printer. The patient surface profile along any grid line can also be plotted and used in conjunction with the com-

pensator data to produce an isodose distribution for the compensated field. (Author abstract) (25 Refs)

35. AFTERLOADING TECHNIQUE FOR INTERSTITIAL IRRADIATION OF LESIONS IN DEEP-SEATED ORGANS.

Kitagawa T, Kakehi M, Kunieda T, Tsukiyama I, Hamada M, Inakoshi H, Sakudo M, Suemasu K, Matsumoto K, Yoneyama T, Iizuka T, Nomura K, Kawachi K
Radiation Therapy Dept., Natl. Cancer Center, 1-1, Tsukiji 5-chome, Chuoku, Tokyo 104, Japan
Radiology; 143(2):543-547 1982

An afterloading procedure using iridium 192 seeds was developed for the control of both localized primary lesions that are difficult to remove and superficial residual lesions that remain after the partial removal of tumors in relatively inaccessible, deep-seated organs. This technique makes possible the delivery of a minimal radiation dose to lesions in deep-seated organs. Fewer complications result, the seeds can be adjusted at appropriate intervals in proportion to the amount of radioactivity desired, and radiation exposure to personnel can be reduced. This paper describes the techniques and apparatus used to place the seeds in the tubing. Primary lesions of the urinary bladder, the prostate gland, and the esophagus, residual lesions in the brain and lung, and metastases in intrapelvic lymph nodes were treated. No technical difficulties or complications were encountered. Radiation exposures to personnel were minimized. The results indicate that the procedure has practical applications. (Author abstract) (10 Refs)

36. EVALUATION OF GAMMA-DISTANCE THERAPY BY FRACTIONATING THE DAILY DOSE IN INOPERABLE MALIGNANT TUMORS.

Mardynskij JuS, Leskov VP
Forschungsinstitut fur medizinische Radiologie der AdmW der UdSSR, ul. Koroljeva 4, 249020 Obninsk, UdSSR, USSR
Radiobiol Radiother (Berl); 23(1):20-24 1982

One hundred thirty-one patients (97 men, 34 women; 36-80 yr old) with cancer did not have surgery. Only 98 of them were considered inoperable. Histologic diagnosis was established in 128 of the patients. Fifty-nine patients had keratinous squamous carcinoma (CA), 18 had non keratinous squamous CA, 29 had undifferentiated CA, 19 had adenocarcinoma, and 3 had others. Seventy of the patients had pulmonary CA, 26 had mandibular and facial CA, 18 had rectal CA, and 17 had esophageal CA. Gamma distance therapy was administered twice daily in equal doses of 2-2.2 Gray with 4-6 hr pause. Total dosage of less than 40 Gray was administered to 9 of the patients, 40-50 Gray to 29, 51-60 Gray to 68, 61-70 Gray to 23, and greater than 70 Gray to 2. Early and immediate results of radiotherapy with fractionated daily dose indicated complete remission (RE) in 24 of the patients, greater than 50% RE in 42, partial RE in 40, no effect in 19, and worsening in 6. The fractionated daily dose was better tolerated, the number of side reactions was lower, and less severe. This type of radiotherapy was especially effective in pulmonary and gastrointestinal CA. (6 Refs) (In GER)

37. WORKING WITH CANCER PATIENTS IN RADIATION THERAPY.

Barstow LF
Yale-New Haven Hosp., New Haven, CT
Health and Soc Work; 7(1):35-40 1982

The establishment of a social work program in the radiotherapy (RT) clinic of the Yale-New Haven Hospital is described. While the main focus of the program is individual work with cancer patients and their families, group work is also an important component of the service. The program is geared to evaluating and fulfilling the patient's psychosocial needs both before, during, and after RT. The specific stresses involved in RT including depression, anger, guilt, anxiety about debility or death, role changes at home and work, financial problems, and dependence on the medical system for care, are dealt with by the program. The physician's inclusion of the social worker in the treatment team during the patients initial clinic evaluation gives the social worker greater acceptance by the patient and family. The social work program has promoted more informal coordination and collaboration between social workers and other oncology services at the hospital. Organization of this collaboration on a more formal basis for joint program development is underway. (6 Refs)

PRE-CLINICAL STUDIES

38. MODIFYING EFFECT OF CALCIUM ON THE EFFICACY OF RADIOTHERAPY OF CANCER.

Frenkel' LA, Iakimova TP, Kniazeva MV
Res. Inst. Medical Radiology, Kharkov, USSR
Radiobiologiia; 22(1):130-133 1982

The modifying effect of calcium on the efficacy of radiotherapy was studied in rats with sc transplanted Guerin's carcinoma. Tumor-bearing animals were subjected to the therapeutic irradiations (350-400 rads) alone or in combination with calcium administration. Calcium concentration in Guerin's carcinoma tissue was 7.0 mg%, compared with 4.02 mg% in the normal muscle tissue. Radiotherapy reduced the calcium level in the tumor tissue to 5.5 mg%. Complete tumor regression was observed in 80% of the animals subjected to radiotherapy alone. Histological manifestations of tumor regression included clusters of the plasmacytes and lymphoid cells, formation of lymphoid follicles, and appearance of the glandular-like tissue with large spherical epithelial cells. Radiotherapy in combination with calcium administration failed to induce tumor regression. It was suggested that the reduced efficacy of radiotherapy after calcium administration is associated with the swelling of the cell membranes and with weakening of the intercellular communications. (8 Refs) (In RUS)

39. TEMPERATURE GRADIENTS AND LOCAL PERFUSION IN A MAMMARY CARCINOMA.

Gullino PM, Jain RK, Grantham FH
NCI, NIH, Bldg. 10, Room 5B-36, Bethesda, MD, 20205
JNCI; 68(3):519-533 1982

Temperature gradients of mammary tumors in random-bred Sprague-Dawley rats under normothermia, hypothermia, and hyperthermia were determined, and their experimental modifications were utilized to assess differences in perfusion rates within the neoplastic tissue. Normothermic tumors showed a circadian rhythm with zenith at midnight and nadir at midday. Differences between highest and lowest temperatures recorded during the 24-hr period reached up to 3 C. Similar oscillations were observed in sc tissue without tumor. An average temperature increment of 0.5-1.0 C was observed when a tumor was transferred from the sc to the abdominal location. Gradients larger than 1 C were observed within the same tumor in locations only a few millimeters distance from each other. The

nonuniformity in temperature within normothermic tumors was exaggerated during hyperthermia. No appreciable change in temperature gradients was seen within a normothermic tumor when tumor blood flow was doubled or reduced to one-third of the basal level. Hyperthermia increased both volume and temperature of tumor efferent blood. As expected, decrease or increase in blood flow during hyperthermia increased or decreased tumor temperature, respectively, but substantial temperature gradients up to 2 C still persisted within adjacent regions. The extent of temperature changes in the tumor could not be correlated with a known change in blood supply. A pulse of cold serum into the tumor afferent artery produced a substantial reduction of tumor blood flow, but only a small depression in tumor temperatures, and a very small change in tumor temperature gradients. No appreciable modification could be brought about in tumor temperature levels and temperature gradients within the tumor by pulses of cold serum in the afferent artery during hyperthermia. After external cooling of the tumor, the time necessary to compensate for temperature depression did not correlate with either the reduction of temperature or with the thickness of the tumor tissue separating the thermistor from the cold source. The results indicate extensive anisotropy of temperature and blood distribution within growing neoplastic tissue and suggest that heat transfer by convection within the tumor is much less effective than it is commonly assumed. (Author abstract) (24 Refs)

40. CELL SURVIVAL AS A DETERMINANT OF TUMOR CURE FOR RAT 9L SUBCUTANEOUS TUMORS FOLLOWING MICROWAVE-INDUCED HYPERTHERMIA.

Wallen CA, Michaelson SM, Wheeler KT
Dept. Radiology, Univ. Utah Medical Center, Salt Lake City, UT, 84132
Eur J Cancer Clin Oncol; 18(1):37-44 1982

The relationship of cell survival to tumor cure after local hyperthermia treatment was studied in sc 9L rat tumors. Tumors weighing 0.2-0.4 g were heated to 42.5, 43.0, 44.0 and 45.0 C by local exposure to 2,450 MHz microwaves. Cell survival data was obtained by an in vivo to in vitro colony forming technique and a cell survival curve was constructed for each temperature as a function of exposure duration (0-180 min). Cell survival followed a simple exponential function with an increasingly steeper slope as temperature increased. At 44 C, it was observed that cells from large tumors (1.0-1.4 g) were inactivated at the same rate as those from small tumors. When tumor response was monitored in the small tumors for 90 days following treatment, a direct correlation between the percentage of tumor cures and time at 44 C (0-60 min) was observed; therefore, at 44 C, tumor cure was exponentially related to cell survival in this range. However, when approximately the same cell survival was obtained with three other temperature-time regimens, the resulting percentage of tumor cures was not the same. These results indicate that while cell survival is related to tumor cure, it is probably not the primary determinant of tumor response following local hyperthermia in these 9L sc tumors. (Author abstract) (29 Refs)

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BREAST NEOPLASMS

1. RADIOTHERAPY OF EARLY BREAST CANCER.

Ford HT

St. George's Hosp., Tooting, London SW17, England

Breast Cancer Management: The Experience of the Combined Breast Clinic, St. George's Hospital/The Royal Marsden Hospital. Coombes RC, Powles TJ, Ford HT, and Gazet JC, ed. London, Academic Press, 317 pp., 1981.

The Royal Marsden approach to radiotherapy of early breast cancer, radiation technique, and results of radiotherapy for primary breast carcinoma during the period 1969-1974 and in the treatment of medial carcinoma since 1974 are discussed. Treatment policy for early breast carcinoma was based on radical surgery for tumors sited in the outer half of the breast or centrally placed. Radiotherapy was given if histologically confirmed axillary nodes were demonstrated in the operation specimen. Since that period the management of medial carcinoma has involved wide local excision and postoperative radiotherapy. Results of these two series indicate that excision followed by radical radiotherapy may be as effective as mastectomy for control of local disease. (9 Refs)

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
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HE 20.3173/2:

2. THE ROLE OF RADIOTHERAPY IN LOCALLY ADVANCED AND METASTATIC BREAST CANCER.

Horwich A
Royal Marsden Hosp., Sutton, Surrey SM2 5PT, England
Breast Cancer Management: The Experience of the Combined Breast Clinic, St. George's Hospital/The Royal Marsden Hospital. Coombes RC, Powles TJ, Ford HT, and Gazet JC, ed. London, Academic Press, 317 pp., 1981.

Syndromes in advanced breast cancer where radiotherapy plays a major role are discussed, and data on patients are presented. Radiotherapy of bone and brain metastases, epidural spinal cord compression, local and regional recurrence, other sites of metastasis, and locally advanced primary disease (T4 tumors) are discussed. Radiotherapy is important in management of patients with advanced breast cancer and is especially indicated in palliation of localized bone pain due to metastasis. The palliation of CNS involvement is more problematic, though a number of patients have had long symptom-free survival following cranial irradiation. (52 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

3. INTRACRANIAL EPENDYMOMA. RESULTS OF RADIOTHERAPY AT THE UNIVERSITY OF KENTUCKY.

Chin HW, Maruyama Y, Markesbery W, Young AB
(c/o Maruyama) Dept. Radiation Medicine, Univ. Kentucky, Lexington, KY, 40536
Cancer; 49(11):2276-2280 1982

Sixteen patients with intracranial ependymoma received radiation treatment at the Department of Radiation Medicine, University of Kentucky, between 1962 and 1974. The majority of intracranial tumors occurred in children and had an infratentorial location; most adult tumors were supratentorial and adults had a greater tendency for high-grade malignant tumors. The overall 5-yr survival rate was 37% with 50% failure within 3 yr. Survival appeared to be closely related to grade of tumor. Therefore, tumors were classified as ependymoma (well-differentiated) or ependymoblastoma (anaplastic, poorly differentiated). Five-yr survival rate in patients with ependymoma tumors was 71% and with ependymoblastoma 11%. The data and a literature review indicate that radical radiotherapy of the ependymoma produces good patient survival; the ependymoblastoma is not adequately controlled with radical radiotherapy alone and adjuvant therapy may be necessary. (Author abstract) (26 Refs)

4. HIGH-DOSE FRACTION RADIATION THERAPY FOR INTRACRANIAL METASTASES OF MALIGNANT MELANOMA. A COMPARISON WITH LOW-DOSE FRACTION THERAPY.

Vlock DR, Kirkwood JM, Leutzinger C, Kapp DS, Fischer JJ
Section Medical Oncology, Yale Univ. Sch. Medicine, 333 Cedar St., New Haven, CT, 06510
Cancer; 49(11):2289-2294 1982

Malignant melanoma is considered unresponsive to conventional radiation therapy when it is delivered at a daily dose rate of 130-300 rad/fraction. Previous studies have suggested that this is in part due to a large shoulder on the radiation survival curve and that higher dose fractions might be beneficial. High-dose fraction therapy is effective for local control of cutaneous, lymph node, and soft-tissue metastases. Results in 46 patients treated with high- or low-dose fractions for intracranial metastases over the last decade in the Melanoma Unit and Department of Radiotherapy at Yale have been examined. Twenty-six patients received high-dose fraction therapy, generally 600 rad/fraction/wk to 2,400-3,600 rad; 20 patients received low-dose fraction radiotherapy with 125-400 rad/fraction daily. All patients were given steroids, and most received chemotherapy. Results in both groups were similar. Comparison of high- and low-dose fraction patients revealed: improvement in 38 and 35%, respectively, stability in 23 and 25%, and deterioration in 38 and 40%. Median survival was 3 mo in the high-dose fraction group and 2.5 mo in the low-dose fraction group. Presence of hepatic metastases had no significant influence upon median survival in patients who received high-dose fraction radiotherapy. In patients receiving low-dose fraction, survival was 2.25 mo with and 3 mo without hepatic metastases. Death in most patients resulted from progression of central nervous system disease. Side effects, especially headache, were more prominent in the high-dose fraction group. However, in no instance did side effects require discontinuation of therapy. The greater ease of delivery for weekly high-dose fraction radiotherapy outweighed any other difference between the regimens. (Author abstract) (19 Refs)

5. EFFECT OF HYPOTHALAMIC AND PITUITARY IRRADIATION ON PUBERTAL DEVELOPMENT IN CHILDREN WITH CRANIAL TUMORS.

Rappaport R, Brauner R, Czernichow P, Thibaud E, Renier D, Zucker JM, Lemerle J
Hopital des Enfants Malades, 149, rue de Sevres, 75730 Paris Cedex 15, France
J Clin Endocrinol Metab; 54(6):1164-1168 1982

The purpose of the present study was to report on gonadotropin function and puberty of a large group of children treated by cranial irradiation for cranial and neck tumors and medulloblastoma. Forty-five children of pubertal age were investigated. The mean interval time since radiation was 5 2/12 yr. Gonadotropin and gonadal function were evaluated by clinical criteria, plasma sex steroids, and plasma LH and FSH responses to LRH. Puberty was complete or progressing normally in 31 cases and was abnormal in 14 cases. Severe gonadotropin deficiency, with lack of or slow progression of puberty and decreased LH and FSH responsiveness to LRH, was observed in five cases; two of these had moderately elevated plasma PRL levels. Secondary amenorrhea or lack of pubertal progression was found in five other cases. GH deficiency was associated with gonadotropin deficiency in 9 of these 10 cases. Adrenal function, estimated by basal dehydroisoepiandrosterone, dehydroisoepiandrosterone sulfate, and estrone, was normal according to pubic hair stages. In conclusion, complete or partial gonadotropin deficiency can be the consequence of cranial irradiation in children receiving 6,000 rads or less. It is usually associated with GH deficiency. The site of the damage on the pituitary gland or the hypothalamus remains to be demonstrated. (Author abstract) (22 Refs)

DIGESTIVE NEOPLASMS

6. CARCINOMA OF THE ESOPHAGUS. OBSERVATIONS OF 40 YEARS.

Parker EF, Gregorie HB, Prioleau WH, Marks RD, Bartles DM
Medical Univ. South Carolina, 171 Ashley Ave., Charleston, SC, 29403
Ann Surg; 195(5):618-623 1982

The long-term results of treatment of primary carcinoma of the esophagus continue to be poor, and attempts to improve them remain as challenging as any that exist in the field of malignant neoplasia today. Even so, there has been improvement, and this report contrasts age, race, sex, levels of involvement, methods of treatment, and results in our first series of 170 cases, seen between 1940 and 1951, with those in our last series of 300 cases, seen between 1967 and 1975. In the latter group, among those treated by megavoltage radiation as the sole theoretically curative method, the 5-yr survival rate was 1.0%. Among operable patients, there were 15 who had resection without preliminary radiation, with a mortality rate of 40% (6/15), a 2-year survival rate of 13% (2/15), and a 5-year survival rate of 7.0% (1/15). Also among operable patients, there were 75 who had resection following radiation therapy with a mortality rate of 19% (14/75), a 2-yr survival rate of 20% (15/75), and a 5-yr survival rate of 10% (7/75). These rates contrast with a 5-yr survival rate of 0.5% in the 1940-1951 series. Improvements in methods of treatment and adjuncts, such as nutrition, radiation, and operation, are cited. Even so, results in our last group did not show improvement over those in the 1962-1967 series. Therefore, we have begun a new program involving the use of chemotherapy in conjunction with radiation therapy and resection in those cases in which it may be applicable. (Author abstract) (10 Refs)

7. MISONIDAZOLE AND UNCONVENTIONAL RADIATION IN ADVANCED SQUAMOUS CELL CARCINOMA OF THE ESOPHAGUS: A PHASE II STUDY OF THE RADIATION THERAPY ONCOLOGY GROUP.

Ydrach AA, Marcial VA, Parsons J, Concannon J, Asbell SO, George F

Dept. Medicine, Puerto Rico Cancer Center, Puerto Rico
Int J Radiat Oncol Biol Phys; 8(3/4):357-359 1982

Tolerance, tumor response, and survival were evaluated in 42 patients with carcinoma of the esophagus who were treated with an unorthodox radiotherapy fractionation regimen combined with misonidazole (MSD). MSD (1.0-1.25 g/square meter) was administered po 4-6 hr prior to irradiation. Radiotherapy (400-rad fractions) was delivered alternately with two or three fractions/wk for a total of 12 fractions in approx 5 wk. The target vol included the esophagus from the thoracic inlet to the gastric cardia for at least the first eight fractions, and then the grossly evident disease was treated with a 5-cm margin above and below the lesion. The planned radiotherapy course was completed by 30/34 patients. Tumor response was poor in 18 evaluable patients; no change in the tumor was reported in 8/18, and complete response was reported in 2/18. No toxicity was reported in 28/38, and mild paresthesias were reported in 7/38. Median survival was 5 mo. Of 26 evaluable patients at 1 yr post accession, only 1 survived. This particular fractionation with MSD was not recommended for Phase III randomized trials on patients with carcinoma of the esophagus. (12 Refs)

8. COMBINED ADJUVANT THERAPY OF RADICALLY OPERATED COLORECTAL CANCER PATIENTS. (CHEMOTHERAPY, RADIOTHERAPY, AND MER-BCG).

Robinson E, Bartal A, Cohen Y, Haim N, Mohilever J, Mekori T
Dept. Oncology, Nothern Israel Oncology Center, Rambam Medical Center, Haifa 35245, Israel
Cancer Chemother Pharmacol; 8(1):35-40 1982

Long-term follow-up of 73 patients who had undergone curative surgery for colorectal cancer and adjuvant therapy is reported. Patients were randomized into groups to be treated with radiochemotherapy (RC) or RC plus methanol extraction residue of BCG (RCM). Forty-four patients had Dukes' C colorectal cancer (DCC) and 29 Dukes' B2 rectosigmoid cancer (DRC). The major characteristics of these patients are summarized. The RCM and RC subgroups were similar, except that in Stage B2 the female/male ratio was higher in the RC-treated than in the RCM-treated patients. The actuarial survival (AS) at 54 mo was 78% in the RCM subgroup and 26% in the RC subgroup. The difference was statistically significant. At 54 mo the difference in AS was no longer significant (53% for the RCM-treated and 25% for the RC-treated patients). In DRC patients, the AS at 42 mo was significantly better in the RCM-treated patients than in those treated with RC. In DCC of the proximal colon a better survival at 54 mo was obtained in nine patients treated with 5-fluorouracil (5-FU) and methanol extraction residue of BCG than in eight patients treated with 5-FU alone. The survival and disease-free interval at 48 mo in DRC patients were 55% and 46%, respectively, for the RCM-treated patients and 61% and 31% in RC-treated patients. In patients with DCC, the disease recurred in 8 (36.4%) of the RCM group and in 12 (54.5%) of the RC group. In patients with DRC, recurrence developed in six (46.2%) RCM-treated patients and in six (37.5%) RC-treated patients. (32 Refs)

GENITOURINARY NEOPLASMS

9. TREATMENT OF T3 BLADDER CANCER: CONTROLLED TRIAL OF PRE-OPERATIVE RADIOTHERAPY AND RADICAL CYSTECTOMY VERSUS RADICAL RADIOTHERAPY. SECOND REPORT AND REVIEW (FOR THE CLINICAL TRIALS GROUP, INSTITUTE OF UROLOGY).

Bloom HJ, Hendry WF, Wallace DM, Skeet RG
Dept. Radiotherapy and Oncology, Royal Marsden Hosp., Fulham Road, London SW3 6JJ, England
Br J Urol; 54(2):136-151 1982

The relative values of preoperative pelvic radiotherapy (4,000 rads) and elective radical cystectomy vs radical radiotherapy (4,000 rads plus 2,000 rads boost) for deeply invasive bladder cancer (category or stage T3 or B2C) have been explored in a multicenter prospective randomized trial involving 189 patients. All patients were eligible for analysis of 5-yr results, 174 had been followed for 7 yr and 81 patients for 10 yr. The results of this trial indicate that the prognosis for patients with deeply invasive (T3 or B2C) carcinoma of bladder is influenced by such factors as age, sex, response to irradiation, tumor size and the presence or absence of pelvic metastases. These factors are analyzed with a review of the relevant literature. At the present state of knowledge, it appears that cystectomy as an elective procedure after preoperative radiotherapy is the treatment of choice for patients aged less than 65, especially males. In patients over 65, and perhaps in females gener-

ally, the most suitable primary treatment is radical radiotherapy with salvage cystectomy reserved for highly selected patients with local tumor recurrence. Future research should be directed towards achieving a more frequent and greater response to irradiation, whether it be given preoperatively or as radical treatment. (31 Refs)

10. DISCOURAGING RESULTS FOR HIGH DOSE EXTERNAL BEAM RADIATION THERAPY IN LOW STAGE (O AND A) BLADDER CANCER.

Whitmore WF, Prout GR
Dept. Urology, Massachusetts General Hosp., Boston, MA
J Urol; 127(5):902-905 1982

Eight patients who received high dose external beam radiation therapy for low stage (O and A) bladder carcinoma with curative intent subsequently presented with recurrent tumors or complications of radiotherapy that led to cystectomy. The dismal results of high dose radiotherapy in these patients prompted us to review the published results for so-called definitive radiation therapy in patients with low stage bladder cancer. From this review and our own patients we conclude that high dose external beam radiotherapy is less than optimal treatment for patients with low stage bladder cancer. This is true for the subset of patients with tumor characteristics that place them at high risk for the subsequent development of invasive disease. (Author abstract) (28 Refs)

11. EXTENDED FIELD RADIATION THERAPY VERSUS DELAYED HORMONAL THERAPY IN NODE POSITIVE PROSTATIC ADENOCARCINOMA.

Paulson DF, Cline WA, Koefoot RB, Hinshaw W, Stephani S, Uro-Oncology Research Group
Duke Univ. Medical Center, P.O. Box 2977, Durham, NC, 17710
J Urol; 127(5):935-937 1982

This study was undertaken to determine the disease control and survival advantage of either extended field megavoltage irradiation or delayed androgen ablation in a randomized clinical trial. Comparison of the two treatments, using either time-to-first evidence of treatment failure or survival, demonstrates an advantage to extended field radiation. (Author abstract) (10 Refs)

GYNECOLOGIC NEOPLASMS

12. RESIDUAL CARCINOMA AFTER INTRACAVITARY IRRADIATION OF ENDOMETRIAL CARCINOMA, STAGE I. A STUDY OF WHOLE-ORGAN SECTIONS.

Grontoft O, Risberg B, Stenson S, Westholm B
Dept. Pathology I, Univ. Hosp., S-581 85 Linkoping, Sweden
Acta Obstet Gynecol Scand; 61(2):163-172 1982

Surgical specimens from 87 patients with endometrial carcinoma, Stage I, preoperatively treated by intracavitary irradiation were investigated by a whole-organ sectioning technique. Re-examination of the curettage material showed cancer Stage 0 in 8 (9%) and carcinoma Stage I in 79 cases (91%). In the Stage I cases 57% showed residual carcinoma localized mainly to the myometrium of the uterine body and cornuae. Histological changes in the carcinoma were unevenly distributed, but tumors growing close to the external uterine surface were well preserved. In 40.5%, no carcinoma was present, and in 2.5% the changes found could not be classified. Correlated to disparity in irradiation technique, no significant difference could be demonstrated in the incidence or localization of residual carcinoma. The most important single pretreatment factor combined with the presence of residual carcinoma was myometrial fragments with infiltrating carcinoma in the curettage material (MICC). Computerized analysis of combinations of factors showed that all patients aged over 60 yr with a uterine-sound length exceeding 8 cm had residual carcinoma. Only two patients with infiltration of the myometrium had a completely destroyed carcinoma. The findings indicate that it is unlikely that endometrial carcinoma Stage I with myometrial invasion will be eradicated by intracavitary irradiation. (Author abstract) (26 Refs)

13. CALIFORNIUM-252 NEUTRON CURIETHERAPY FOR ADVANCED CERVICAL CANCER.

Maruyama Y, Bell PR, Yoneda J, Van Nagell JR
Dept. Radiation Medicine, Univ. Kentucky Medical Center, Lexington, KY, 40536
Oncology; 39(4):209-215 1982

Low dose rate neutron radiotherapy using fast neutrons emitted by the radionuclide 252Cf was combined with fractionated x- or gamma rays for the radiotherapy of advanced cervicovaginal tumors. Two different implants schedules were tested to determine the response of the tumors to the scheduling of therapy with the 252Cf either early or delayed in the fractionated radiotherapy course. A 90% frequency of complete local clearance of pelvic tumors was observed by the early application of 252Cf. Neutron curietherapy applied as a boost treatment at the end of fractionated radiotherapy, resulted in only 40% local control. Improved results were observed by early implantation therapy and is postulated to be the result of more effective hypoxic tumor therapy and reoxygenation of the hypoxic pelvic tumor. The two groups of patients were compared as to their general status and medical condition and were found similar in age, frequency of associated disease, body weight and tumor stage. The failures of local control by early 252Cf neutron therapy, occurred in two patients with high-stage tumor and severe vascular disease and suggests that tumor response was partly dependent upon the integrity and elasticity of the small vessel system. (Author abstract) (33 Refs)

HEAD AND NECK NEOPLASMS

14. THE USE OF HIGH-ENERGY ELECTRONS IN THE TREATMENT OF MALIGNANT ORBITAL TUMORS.

Lommatzsch PK, Welker KW, Huttner J, Bauke G
Univ.-Augenklinik, Liebigstrasse 14, DDR-701 Leipzig, E. Germany
Klin Monatsbl Augenheilkd; 180(3):198-202 1982

Eight patients (2 men and 6 women, 36-93 yr old) with lymphatic tumors of the orbit, including non-Hodgkin's lymphoma, were treated with radiotherapy. The orbit was irradiated with 2,000-3,600 rad using a special tube containing a plexiglass rod to protect the eye. Rapid regression and complete remission were obtained in all cases. No recurrences were noted in 6 mo-3 yr observation. Two patients died of causes other than the tumor. (7 Refs) (In GER)

15. RELATIONSHIP BETWEEN THE PROLIFERATING ACTIVITY AND THE RESPONSE OF MOUTH TUMORS TO RADIOTHERAPY.

Karakulov RK, Poliakov PIu, Pelevina II, Kiseleva ES, Dar'ialova SL, Saenko AS
Inst. Chemical Physics, Moscow, USSR
Med Radiol (Mosk); 27(3):16-23 1982

The effect of the kinetic parameters of cell proliferation on the efficacy of radiotherapy (RT) was studied in 11 patients with Stage II-III squamous cell carcinoma of the mouth and oropharynx. The patients received modified fractionated RT: 400 rads/day during the first 3 days, 100 rads, bid during the next 3-10 days up to a total focal dose of 2,600-3,000 rads. After a 7-15-day interval, the irradiations were repeated to a total focal dose of 5,000-6,000 rads. Biopsy specimens were obtained prior to the RT and after application of 1,200 rads. The mitotic index in nonirradiated tumors ranged from 8.0% to 22.5%. The DNA-polymerase index ranged from 19% to 33.2%. Significant (3-5-fold) decrease of MI after irradiation with 1,200 rads was correlated with tumor regression after completion of RT. Similarly, a 4-10-fold decrease of the fraction of proliferating cells coincided with complete tumor regression. Tumor regression did not depend upon the MI or the fraction of proliferating cells prior to the RT. (21 Refs) (In RUS)

16. NEUROTOXIC RADIOSENSITIZERS AND HEAD AND NECK CANCER PATIENTS - HOW MANY WILL BENEFIT?

Cummings BJ, Thomas GM, Rauth AM, Sorrenti V, Black B, Bush RS
500 Sherbourne St., Toronto, Ontario, M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 8(3/4):343-345 1982

Of 159 patients with primary squamous cell carcinoma of the oral cavity and oropharynx, only 26/111 treated with radical irradiation were eligible for Phase I study of metronidazole (MET) as a hypoxic cell sensitizer. Criteria for eligibility are reviewed. Of 159 original patients, 153 were identified by the investigators, 150 were available for follow-up, 111 were planned for radical radiation, 95 were 30-69 yr old, 70 had normal nervous system history, 64 had no medical contraindication to MET treatment, 62 had no synchronous primary malignancy, 51 could be scheduled to receive 5,000 rad/20 fractions/4 wk, 48 had physician consent for receiving MET, 29 agreed to participate, and 26 had normal nervous system on examination. These 26 patients represent only 16% of the patients with primary carcinoma of the oral cavity or oropharynx and 23% of those who were treated by radical radiation therapy. Criteria for patient selection for studies of hypoxic cell sensitizers must be known so that data from different studies can be assessed appropriately before extrapolation to the general patient population. Factors that might influence patient entry must be taken into account in all clinical trials. (6 Refs)

17. A REPORT ON MISONIDAZOLE IN A RANDOMIZED TRIAL IN LOCALLY ADVANCED HEAD AND NECK CANCER.

Sealy R, Williams A, Cridland S, Statford M, Minchinton A, Hallet C
Dept. Radiotherapy, Groote Schuur Hosp., Cape Town, South Africa
Int J Radiat Oncol Biol Phys; 8(3/4):339-342 1982

The effect of radiotherapy and misonidazole (MISO), a drug which sensitizes hypoxic normal and tumor cells to photon radiation, was examined in 97 patients with inoperable squamous carcinoma of the mouth and pharynx. Fifty patients were given MISO (2 g/square meter (m2) body surface area, po). All patients received a tumor dose of 3,600 rad in 6 fractions in 17 days. Eighteen patients developed toxicity which could be due to MISO therapy. The neuropathy was always sensory in character, with a stocking distribution and often worse at night. One patient experienced a cardiovascular accident and died during therapy. No differences between the patients given radiotherapy alone and those given radiotherapy and MISO were found for time to death or relapse. The blood levels achieved with this dosage scheme might have led to an expectation of 20% improvement in tumor control, but tumor concentrations of the drug are likely to be less than those found in the blood and may vary widely. An improved method of dose scheduling, or possible local application, will have to be found for the drug to be effective as the sole sensitizer. (9 Refs)

18. MISONIDAZOLE IN PATIENTS RECEIVING RADICAL RADIOTHERAPY: PHARMACOKINETIC EFFECTS OF PHENYTOIN TUMOR RESPONSE AND NEUROTOXICITY.

Moore JL, Paterson IC, Dawes PJ, Henk JM
South Wales Radiotherapy and Oncology Service, Velindre Hosp., Cardiff, Wales
Int J Radiat Oncol Biol Phys; 8(3/4):361-364 1982

Tumor response and persistence of neuropathy was studied in 29 patients treated 2.5 yr before with a fractionation regimen and misonidazole (MSD) for advanced tumors of the head and neck. The radiotherapy consisted of 10 fractions administered in 3 wk; MSD (1.2 g/square meter) was given on each treatment day 3-4 hr prior to radiotherapy. The results of treatment using MSD compared quite favorably with those obtained with hyperbaric oxygen therapy. The incidence of MSD neuropathy was approx 55%. Some improvement of neuropathy was observed over the 2.5-yr period in 9/16 patients, but approx 35% of the patients suffered from neuropathy at the time of death or at 2.5 yr after treatment. Although not significantly correlated, patient survival was linked to development of neuropathy as the patients who developed neuropathy tended to survive longer than those who did not develop neuropathy. In 13 patients, administration of phenytoin reduced the half-life of MSD and total-MSD by 25-35% within 5 days of starting treatment. The concentration of MSD at the time of irradiation was unaffected by phenytoin but the maximum plasma concentration probably occurred nearer to hr 2 than hr 3.5. (12 Refs)

19. EXTERNAL IRRADIATION THERAPY OF MALIGNANT TUMORS OF THE THYROID GLAND: ANALYSIS OF 54 CASES.

Hohenberg G, Heckenthaler W
Universitatsklinik for Strahlentherapie und Strahlenbiologie, Alser Strasse 4, A-1090 Wien, Austria
Wien Klin Wochenschr; 94(6):153-157 1982

Fifty-four patients (12 men and 42 women) were treated with external irradiation following surgery for malignant tumors of the thyroid. Prior history of thyroid disease was indicated in 36 cases. Diagnosis was confirmed by scintigraphy and fine-needle biopsy. Surgery was radical in 42 cases and nonradical in 12 cases; 10 patients also underwent modified neck dissection. Tumors included eight follicular carcinomas, seven malignant conversions of adenomas, five papillary carcinomas, five undifferentiated carcinomas, five sarcomas, five partially follicular and partially papillary carcinomas, and five medullary carcinomas. Irradiation was begun in most cases within 3 mo after surgery. Radiotherapy consisted of Co-60

gamma-rays in 12 cases, electrons from a circular accelerator in 38 cases, and gamma-rays plus electrons in 4 cases. Radical surgery was followed by a total dose of up to approx 50 Gray; nonradical surgery was followed by 60-65 Gray over 6-7 wk. Of 54 patients, 30 (9 men and 21 women) died, including 7 with local recurrence, 5 with local recurrence and metastases, and 3 with distant metastases only. The av interval until appearance of recurrence was 9.2 mo. The av survival time was 12.3 mo. The overall 5-yr survival rate was 48.1%. Among surviving patients the only complications were redness of skin, difficulty in swallowing, oral dryness, and loss of appetite. No late effects of radiotherapy were noted. (19 Refs) (In GER)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

20. CONCLUSIONS FROM CLINICAL TRIALS OF THE SOUTHWEST ONCOLOGY GROUP.

Jones SE, Coltman CA, Grozea PN, DePersio EJ, Dixon DO
Section Hematology and Oncology, Dept. Internal Medicine, Univ. Arizona Health Sciences Center, 4-West Clinic Facility, Tucson, AZ, 85724
Cancer Treat Rep; 66(4):847-853 1982

Mature data from four clinical trials conducted by the Southwest Oncology Group from 1971 to 1978 for patients with all stages of Hodgkin's disease (HD) are reviewed in this paper. In the RAC 1 trial of Stage I and II HD we demonstrated that involved-field radiotherapy plus six courses of chlormethine, vincristine, procarbazine and prednisone (MOPP) chemotherapy improved relapse-free survival compared to standard radiotherapy alone ($p = 0.12$), especially in patients with B symptoms (p less than 0.03) or mediastinal disease ($p = 0.08$). However, at present, there is no significant difference in overall survival. In the CAR 1 study for patients with pathologic Stage IIB, IIIA, and IIIB HD, we demonstrated that three or four courses of MOPP before radiotherapy produced a 90% complete remission (CR) rate, with 70% of the patients remaining free of disease at 5 yr. In the CAR 2 study for patients with pathologic Stage IIIA or IIIB disease, we demonstrated that chemotherapy alone (MOPP-bleomycin) was as effective as combined modality treatment (MOPP-bleomycin plus radiotherapy) in terms of CR rate (85% versus 89%, respectively), relapse-free survival, and survival. For advanced stages of HD we added doxorubicin to our MOPP-bleomycin schedule and demonstrated that MOP-BAP produced a 77% CR rate compared to 67% for MOPP-bleomycin ($p = 0.10$). Moreover, MOP-BAP produced consistently superior CR rates and survival in patients with more prognostically favorable presentations of HD. Our new ongoing study (MOPP 6) incorporates many of the concepts derived from these earlier clinical investigations. (Author abstract) (24 Refs)

21. ROLE OF RADIATION THERAPY IN THE TREATMENT OF HODGKIN'S DISEASE.

Hellman S, Mauch P
Joint Center for Radiation Therapy, Dept. Radiation Therapy, Harvard Medical Sch., 50 Binney St., Boston, MA, 02115
Cancer Treat Rep; 66(4):915-923 1982

We reviewed the results of 10 yr of experience in treating 405 patients with Stage IA-IIIB Hodgkin's disease at the Joint Center for Radiation Therapy. It appears that 'total nodal irradiation' may largely be avoided. For supradiaphragmatic Stage I and IIA disease, mantle and para-aortic irradiation result in excellent relapse-free survival except in patients with large mediastinal masses. Stage IIB patients can be treated similarly to those in Stage IIA. Stage IIIA patients treated with total nodal irradiation alone fare less well. Combined modality treatment improves survival markedly but may cause excessive complications. For Stage IIIIA, we currently recommend that patients be treated with mantle and para-aortic nodal irradiation, with chemotherapy used only in those who fail. We treat Stage IIIA2A and IIIB patients with both chemotherapy and radiation. (Author abstract) (25 Refs)

22. CHEMOTHERAPY AND COMBINED MODALITY THERAPY FOR HODGKIN'S DISEASE: A PROGRESS REPORT ON CANCER AND LEUKEMIA GROUP B STUDIES.

Bloomfield CD, Pajak TF, Glicksman AS, Gottlieb AJ, Coleman M, Nissen NI, Rafla S, Stutzman L, Vinciguerra V, Glidewell OJ, Holland JF
Box 277, Univ. Minnesota Hosp., Minneapolis, MN, 55455
Cancer Treat Rep; 66(4):835-846 1982

Between 1974 and 1977, the Cancer and Leukemia Group B (CALGB) initiated four studies which address current major questions in the therapy for Hodgkin's disease. The efficacy of chemotherapy alone as compared with combined modality therapy in patients with poor-prognosis Stages I and II is evaluated in CALGB 7751. Currently, both therapies produce very high complete remission rates in asymptomatic patients; the remission rate is better with combined modality therapy in symptomatic patients. Single and combined modality therapies are compared for Stage III patients in CALGB 7451. Complete remission rates have been similar, but relapse-free survival is superior for patients treated with total nodal radiotherapy followed by chemotherapy ($p = 0.04$). In particular, Stage IIIA patients with nodular sclerosis seem to benefit from the inclusion of radiotherapy in their initial treatment. In CALGB 7551, the efficacy of chemotherapy alone versus chemotherapy plus radiotherapy to areas of bulky disease is under study in patients with Stages IIIB and IV. Currently, a relapse rate of less than 10% has been seen among sites irradiated, and survival is best for patients treated with radiotherapy bracketed by chemotherapy. Finally, the role of two alternating non-cross-resistant combination chemotherapy programs is being studied in CALGB 7552. Relapse-free and overall survival is better with the doxorubicin-containing regimen than with either the alternating or alternate chemotherapy program. At present, the median followup for each of these studies is less than 5 years. Further observation is required to answere the critical question relating to prolonged disease-free survival and cure. (Author abstract) (23 Refs)

23. STAGE I AND II HODGKIN'S DISEASE: INVOLVED-FIELD RADIOTHERAPY VERSUS EXTENDED-FIELD RADIOTHERAPY VERSUS INVOLVED-FIELD RADIOTHERAPY FOLLOWED BY SIX CYCLES OF MOPP.

Hagemeister FB, Fuller LM, Velasquez WS, Sullivan JA, North L, Butler JJ, Johnston DA, Shullenberger CC
Div. Medical Sciences, Dept. Medicine, Univ. Texas System Cancer Center, M. D. Anderson Hosp. and Tumor Inst., 6723 Bertner Ave., Houston, TX, 77030
Cancer Treat Rep; 66(4):789-798 1982

Results of laparotomy treatment in staged patients with Stage I or II Hodgkin's disease were investigated in 90 patients treated by involved-field (IF) radiotherapy, 65 by extended-

field (EF) radiotherapy, and 41 by IF plus MOPP chemotherapy [mechlorethamine, vincristine (oncovin), prednisone, and procarbazine; 6 cycles]. Of the 196 evaluable patients, 101 had mediastinal disease and 95 did not. Five-yr survival rates were 94% for patients treated with IF, 94% for those treated with EF, and 98% for those treated with IF + MOPP. However, the 5-yr disease-free survival rates were 90% for those treated with IF + MOPP, 72% with IF alone, and 66% with EF. Patients without mediastinal disease had better survival results than those who had mediastinal involvement at presentation. Pathology appeared to have no effect on treatment results of patients treated with radiotherapy alone. Patients with large mediastinal disease tended to relapse most often in the thoracic area, those without mediastinal disease relapsed most often in nonirradiated nodes of the upper and lower torso. Treatment of relapsed patients was more successful when the relapse was in a nodal area not previously treated with radiotherapy. Few complications of therapy occurred, and chemotherapy was well tolerated by most patients. These findings were used to construct a treatment plan for patients with Stage I or II Hodgkin's disease. (27 Refs)

24. RADIOTHERAPY VERSUS COMBINED MODALITY TREATMENT OF STAGE I AND II HODGKIN'S DISEASE.

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Dept. Internal Medicine, Finsen Inst., Strandboulevarden 49, DK-2100 Copenhagen, Denmark
Cancer Treat Rep; 66(4):799-803 1982

In a multicenter study in which data from all Hodgkin's disease patients in Denmark have been registered since 1971, all patients with supradiaphragmatic Stage I and II disease (as confirmed by staging laparotomy) were randomized to receive radiotherapy (RT) to supradiaphragmatic and infradiaphragmatic lymph node regions (total nodal irradiation) or RT to a mantle field followed by six cycles of MOPP (chlormethine, vincristine, procarbazine and prednisone) combination chemotherapy (CT) (RT plus CT). Interim results up to July 1980, when 261 patients had entered the study, showed 28 failures among 128 patients in the total nodal irradiation group and four failures among 133 patients in the RT plus CT group (p less than 0.05). Stage II, nodular sclerosing or mixed cellular histology, and gross hilar/mediastinal involvement defined subsets of patients in the RT group with a relatively high relapse frequency. Salvage treatment of the relapsed patients has so far been good and there is as yet no difference in overall survival. However, longer observation time is needed before the cure rate can be evaluated with certainty. Two patients treated with RT alone and one treated with RT plus CT developed acute myeloid leukemia. (Author abstract) (11 Refs)

25. INTERGROUP HODGKIN'S DISEASE IN CHILDREN STUDY OF STAGES I AND II: A PRELIMINARY REPORT.

Sullivan MP, Fuller LM, Chen T, Fisher R, Fryer C, Gehan E, Gilchrist GS, Hays D, Hanson W, Heller R, Higgins G, Jenkin D, Kung F, Sheehan W, Tefft M, Ternberg J, Wharam M
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Cancer Treat Rep; 66(4):937-947 1982

The intergroup study of involved-field (IF) radiotherapy, IF radiotherapy plus mechlorethamine, vincristine, prednisone and procarbazine (MOPP) chemotherapy, and extended-field (EF) radiotherapy for treatment of Hodgkin's disease in children has assessed 305 patients. Of these, 279 were 'not ineligible' (no immediate cause for disqualification). Among 223 randomized patients, 144 were evaluable, 131 had documentation of complete or partial remission, 20 of the remitters relapsed, and 2 died. Among 62 nonrandomized patients with favorable presentations (unilateral upper neck, unilateral inguinal, or massive mediastinal disease), 29 had documented remission, 2 relapsed, and none died. Length of initial disease control (LIDC) was used to measure duration of response. LIDC was best in patients given IF plus MOPP, and 95% are disease free. EF was better than IF radiotherapy ($p = 0.004$). Of the disease characteristics prognostic for response (stage, histologic subtype, and presence of symptoms), only the last factor had a statistically significant effect on LIDC ($p = 0.004$). Ninety-six percent of the patients survive. Using criteria developed by the committee, 23% of the staging procedures reviewed were nonevaluable and 28% of the radiotherapy treatments were nonevaluable. The necessity for criteria for evaluation of staging and treatment is certain. Length of follow-up is too short for correlations of treatment with significant late effects and for relevant therapeutic recommendations. (Author abstract) (10 Refs)

26. MULTIDISCIPLINARY TREATMENT OF ADVANCED HODGKIN'S DISEASE BY AN ALTERNATING CHEMOTHERAPEUTIC REGIMEN OF MOPP/ABDV AND LOW-DOSE RADIATION THERAPY RESTRICTED TO ORIGINALLY BULKY DISEASE.

Young CW, Straus DJ, Myers J, Passe S, Nisce LZ, Lee BJ, Koziner B, Arlin Z, Kempin S, Gee T, Clarkson BD
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Cancer Treat Rep; 66(4):907-914 1982

Ninety-one evaluable patients with advanced Hodgkin's disease (patients with Stages IIB, IIIB, or IV disease and patients with stage IIIA disease who were greater than 35 yr old or had mixed cellularity or lymphocyte depletion histology) received chemotherapy with MOPP (mechlorethamine, vincristine, prednisone and procarbazine) and ABDV (doxorubicin, bleomycin, dacarbazine and vinblastine) given in alternating months; radiation therapy (RT) (2,000 rad in 2 wk) was given during Month 5 of therapy to the previously untreated patients through ports that were limited to the originally bulky disease. The complete remission rates observed were: 88% in previously untreated patients, 69% in patients who had had prior RT but minimal chemotherapy, and 50% in patients who had had prior heavy chemotherapy. The actuarial relapse-free survival rates at 4 yr, for patients who had complete remission, are: previously untreated, 84%; prior RT, 70%; and prior heavy chemotherapy, 30%. The total actuarial survival rates at 5 yr for all 118 patients, evaluable and nonevaluable, who were entered in the study, are: previously untreated, 80%; prior RT, 57%; and prior heavy chemotherapy, 40%. (Author abstract) (15 Refs)

27. TREATMENT OF STAGE IIIA HODGKIN'S DISEASE.

Neely SM, Golomb HM
Box 420, 950 E 59th St., Chicago, IL, 60637
Cancer Treat Rep; 66(4):827-834 1982

Current treatment for Stage IIIA Hodgkin's disease consists of total nodal radiation therapy or a combination of radiation therapy (RT) and chemotherapy. In most series, 50%-65% of Stage IIIA patients receiving RT alone have a 5-year disease-free survival (DFS); when chemotherapy is added to RT, the percent of patients having a 5-year DFS is increased to 76%-89%. At the University of Chicago we have identified prognostic subgroups of patients, based on the extent of abdominal disease. Pathologic substage III2A patients treated with total

nodal RT alone have a significantly lower 5-year DFS rate (54%) than do III2A patients treated with combined-modality therapy (100%; p = 0.015). Pathologic Substage III1A patients in the two treatment groups show no significant differences in 5-year DFS (p = 0.69). Given the potential for long-term morbidity following combined-modality therapy, we recommended that careful pathologic staging be used to determine which patients would benefit most from RT plus chemotherapy. Future treatment programs must be designed to minimize chronic morbidity while maintaining or improving cure rates. (Author abstract) (24 Refs)

28. RESULTS OF LUNG IRRADIATION FOR HODGKIN'S DISEASE PATIENTS WITH LARGE MEDIASTINAL MASSES AND/OR HILAR DISEASE.

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Cancer Treat Rep; 66(4):819-825 1982

From 1970 to 1979, 130 patients with Hodgkin's disease were seen at the University of Minnesota and were treated with curative radiotherapy following surgical staging. Thirty-nine of the 130 patients had large mediastinal masses. Twenty patients with large mediastinal masses treated before 1975 received regular mantle-field irradiation. Our treatment technique was modified in 1975 because of frequent recurrences in the intrathoracic region in these patients. Between 1975 and 1979, patients with large mediastinal masses were treated with low-dose lung irradiation as an initial part of the mantle-field treatment. Nineteen patients were treated in this manner, and 16 of these 19 have been followed for greater than 24 months. Only one of the 16 patients has had a recurrence in the lung. We have not seen any serious acute or subacute pulmonary or cardiac complications after low-dose lung irradiation. The followup period is still too brief for the study of late complications. Analysis of our results with lung irradiation reveals excellent control of large mediastinal masses and significantly improved recurrence-free survival. (Author abstract) (26 Refs)

MUSCULOSKELETAL NEOPLASMS

29. STUDIES ON HISTOLOGIC CHANGES IN NORMAL AND NEOPLASTIC CELLS INDUCED BY HYPERTHERMIA ASSOCIATED WITH HIGH ENERGY IRRADIATION.

Santori FS, Folliero A, Ghera S
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Boll Soc Ital Biol Sper; 57(23):2394-2400 1981

Effect of hyperthermia (HT) produced by microwaves associated with radiotherapy (RT) was evaluated histologically in normal and neoplastic cells. One patient with osteosarcoma received RT (4,000 rad) and HT (9 sessions) and another patient with telangiectatic sarcoma (TS) received RT (7,000 raf) and HT (4 sessions). Histologic examination of both patients showed that in the most distant tissues HT produced pathologic osseous tissue, areas of necrosis, and also were found active cellular and neoplastic elements. In tissue in direct contact with HT, the neoplastic cells were completely absent, and in their place were fibrous and connective tissue inducing repair, remnants of pathologic osseous tissue undergoing calcification, and absence of pathologic cellular elements. HT increased considerably the effect of RT on the neoplastic cells (massive necrosis was superior to the effect of RT alone). The effect of HT was reduced in distant tissue especially in the patient with TS, because the heat dissipation was even more pronounced due to the abundant vascularization. HT produced by microwaves associated with RT is effective in the therapy of superficial lesions. For deeper lesions RT should be associated with HT from other sources. (8 Refs) (In ITA)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

30. COMPUTERIZED TOMOGRAPHY AND COMPUTER-ASSISTED IRRADIATION PLANNING IN THE RADIOTHERAPY OF BRONCHOGENIC CARCINOMA: PRELIMINARY RESULTS.

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Prax Klin Pneumol; 35(Suppl1):926-930 1981

The cure rate of radiotherapy for cases of inoperable bronchogenic carcinoma can be improved by improving radiation dose distribution. Improvement is made possible by the use of computerized sectional radiography of the thorax and an individual calculation of isodose curves using a computer program. Cooperation between radiotherapist, radiophysicist, and thoracic surgeon is required. Organotopographic data, risks, and tolerance of critical structures must be assessed. The method produces favorable results, justifying the time and technical demands involved. (4 Refs) (In GER)

31. LIFE PROLONGATION AND 5-YEAR SURVIVAL BY INTENSIVE IRRADIATION OF INOPERABLE LUNG CANCER.

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Excerpta Med Int Congr Ser; 558:285-290 1982

The influence of intensive irradiation of inoperable lung cancer on 5-yr survival was studied in 123 patients treated with minimum tumor dose (MTD) of 3,500 centiGray (cGy) for 200 kilovolt (kV) therapy and in 1,046 patients treated with MTD of 5,000 cGy for telecobalt therapy (TCT). TCT-treated patients were divided into four groups: Group I composed of 77 patients (females, av age 62 yr), Group II 438 patients irradiated 'in time,' Group III 153 patients (av age 63 yr) with fully differentiated squamous-cell carcinoma, and Group IV 240 patients (av age 59.7 yr) presenting oat-cell carcinoma. Total results for the period when 200 kV x-rays were used and for the patients treated with TCT showed increasing survival over 1-3 yr in the high voltage-treated patients. Survival rates for the special groups are presented; 19-43% of patients survived 1 yr, 4-9% 3 yr, and 2.5-6.5% 5 yr. For Group IV the mean survival time was 10.55 mo; 6/240 patients lived longer than 5 yr after the start of treatment. Twenty-eight patients (25 males, 3 females, av age 63.5 yr) survived for at least 5 yr. Autopsy was performed on 17/24 patients who had died. Six of 17 patients still had tumors, 2 in the form of a local relapse and 4 as distant metastases. For the remaining 11 patients, cardiac insufficiency or pneumonia was given as the cause of death. (13 Refs)

32. TREATMENT OF PATIENTS WITH FAR ADVANCED LUNG CANCER.

Kas'ianenko IV, Pirogov AI, Muravskaia GV
No affiliation given
Vopr Onkol; 28(2):56-61 1982

The results of multicenter studies of the efficacy of various treatments of far advanced lung cancer (LC) are reviewed. Chemotherapy in combination with radiotherapy was used in 258 patients with inoperable LC; objective improvement was acieved in 60.5% of the patients. Av duration of survival was 12.4 mo, compared with 6.7 mo after exploratory thoracotomy alone. The 1-, 3-, and 5-yr survival rates in the patients with Stage III epidermoid LC subjected to surgery in combination with preoperative radiotherapy were 91%, 38%, and 20%, respectively, compared with 55.4%, 18.3%, and 14.5%, respectively, after surgery alone. Three-drug polychemotherapy was used in the treatment of 400 patients with inoperable LC: objective improvement was achieved in 17% of the patients, compared with 8% after monochemotherapy with cyclophosphamide. Of 600 patients subjected to radiotherapy in combination with monochemotherapy, 68% showed objective improvement, compared with 55% after radiotherapy alone. The 6-mo survivals were 66.8% and 58.5%, respectively. Split-course radiotherapy in combination with polychemotherapy produced objective improvement in 86.6% of the patients, compared with 72-73% after split-course radiotherapy in combination with monochemotherapy. (15 Refs) (In RUS)

33. COMBINED RADIO-CHEMOTHERAPY OF SQUAMOUS CELL CARCINOMA OF THE LUNG.

Illiger HJ, Fromnhold H, Hartlapp JH, Grauthoff B, Schwabe KH
Medizinische Universitatsklinik, Sigmund-Freud-Strasse 25, D-5300 Bonn 1, W. Germany
Prax Klin Pneumol; 35(Suppl1):931-934 1981

The effectiveness of combined radiotherapy (RT) and chemotherapy (CT) was studied in patients with nonsmall-cell carcinoma of the lung. A total of 38 patients were treated, of whom 35 were evaluable. Twenty-six patients were free of metastases at the time of treatment; 25 of them had squamous-cell carcinoma (SCC). Local RT consisted of a total dose of 40-60 Gray delivered in individual doses of 1.5-4 Gray, 3-5 days/wk. CT consisted of 5-Fluorouracil (5-FU: 15 mg/kg body wt on 3 consecutive days) administered simultaneously with RT. 5-FU was administered iv as a bolus. Therapy was generally well tolerated. Side effects included vomiting (5 cases), diarrhea (3 cases), abdominal pain (2 cases), stomatitis (4 cases), fever (3 cases), fall in Hb levels (17 cases), fall in WBC count (28 cases), thrombopenia (10 cases), radiation erythema (3 cases), and local pulmonary fibrosis (8 cases). In no case did side effects require terminating therapy. Dosage was limited by stomatitis and myelosuppression. For patients with SCC the av survival time with combined therapy was 12 mo, compared with 10 for RT in previously reported studies. Four patients were alive at the time of this report, including one after 2 yr and three after 3 yr; all four were free of active disease. Results indicate that combined therapy does not adversely affect survival and is justified because of the potential radiosensitizing effect of 5-FU. (23 Refs) (In GER)

34. A CONTROLLED CLINICAL TRIAL OF MISONIDAZOLE IN THE RADIOTHERAPY OF PATIENTS WITH CARCINOMA OF THE BRONCHUS.

Saunders MI, Anderson P, Dische S, Martin WM
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Int J Radiat Oncol Biol Phys; 8(3/4):347-350 1982

A double-blind randomized controlled clinical trial of misonidazole (MIS) in the six fraction technique of radiotherapy for treatment of carcinoma of the bronchus was conducted. All patients had squamous and large-cell undifferentiated carcinoma of the bronchus and were unsuitable for surgery but had no evidence of metastases beyond the thorax. A total of 62 patients were randomized: 33 to receive MIS (27 males, 6 females), 29 the placebo (24 males, 5 females). Radiotherapy was completed in 61 patients: max tumor dose 3,500 rad given in 6 fractions over 18-20 days, treating 2x/wk. For all cases, the probability of survival at 6 mo was 78%, at 1 yr 42%, and at 2 yr 12%. No difference in survival was noted in patients given MIS compared with those given the placebo. In 52 patients, an estimate of the percentage regression of tumor 2 mo after the start of radiotherapy was possible. No difference was noted between the two groups and the percentage regression did not correlate with survival. There was no difference in the growth-delay time between MIS and the placebo or in the skin reaction according to randomization. Sensory peripheral neuropathy was observed in 14/62 patients: 12 given MIS, 2 the placebo. The peripheral neuropathy rate with MIS was 36% (12/33). Of the 54 patients who died, 28 had received MIS and 26 placebo. In the MIS group the thoracic tumor was the primary cause of death in 61% (17/28) compared to 85% (22/26) of the placebo patients. Thus, MIS did not give any significant advantage to patients treated using a six fraction technique of radiotherapy. Possible reasons for this failure are listed. (3 Refs)

35. ELECTIVE BRAIN IRRADIATION IN PATIENTS WITH SMALL-CELL CARCINOMA OF THE LUNG: PRELIMINARY REPORT.

Katsenis AT, Karpasitis N, Giannakakis D, Maragoudakis N, Kiparissiadis P
Radiotherapy Dept., Greek Anticancer Inst., Saint Savas Hosp., Athens, Greece
Excerpta Med Int Congr Ser; 558:277-284 1982

Thirty-five patients (33 males, 2 females) with small-cell carcinoma of the lung (SCCL) but no brain metastases were evaluated for effectiveness of elective brain irradiation. All patients were treated by chemotherapy and radiation therapy. Seventeen patients received prophylactic brain irradiation (PBI): a total dose of 4,000 rads during 3.5 wk. Objective response (complete and partial) was observed in 93.75% of the group with localized disease (LCD) and in 52.63% of those with extensive disease (EXD). In LCD patients, complete remission (CR) was achieved in 37.5% and partial regression (PR) in 56.25%. In the EXD patients, CR occurred in 10.52% and PR in 42.10%. No difference in the duration of remission was observed between the groups with and without PBI. In the group with PBI, brain metastases occurred in two patients 7 and 8 mo after completion of therapy; both patients belonged to the EXD group. In the group without PBI, brain metastases occurred between 3 and 6 mo, and in only one patient 7 mo after completion of therapy. Within the LCD group, survival was 6 mo in 87.5% of PBI-treated patients and 10 mo in 50.0%; for the patients not treated with PBI, survival was 6 mo in 75.0% and 10 mo in 50.0%. The corresponding survival in the EXD group was 6 mo in 44.4% and 10 mo in 11.1% of PBI-treated

patients, and 6 mo in 40.0% and 10 mo in 10.0% of patients not treated with PBI. No serious complications related to irradiation of the primary site and the brain were observed. Hematological toxicity, related mainly to chemotherapy and severe enough to justify interruption of therapy, occurred in six patients; all of them were able to complete the treatment course after discontinuing therapy for a short period of time. Results confirm the efficacy of PBI in reducing incidence of brain relapses in SCCL. (19 Refs)

INSTRUMENTATION AND TECHNOLOGY

36. INTRAOPERATIVE IRRADIATION. A PILOT STUDY COMBINING EXTERNAL BEAM PHOTONS WITH 'BOOST' DOSE INTRAOPERATIVE ELECTRONS.

Gunderson LL, Shipley WU, Suit HD, Epp ER, Nardi G, Wood W, Cohen A, Nelson J, Battit G, Biggs PJ, Russell A, Rockett A, Clark D

Dept. Therapeutic Radiology, Mayo Clinic, Rochester, MN, 55901
Cancer; 49(11):2259-2266 1982

Intraoperative 'boost' dose electron beam therapy given in combination with 4,500-5,000 rad (45-50 Gray) external beam irradiation has been demonstrated as a practical therapeutic modality at the MGH. This procedure has been employed thus far in 58 patients; the results in the initial 36 are analyzed in detail in this paper. Thirty-four of the 36 patients had locally advanced lesions - unresectable, recurrent, or residual disease. Results achieved to date are in full agreement with our expectations: high radiation doses have been delivered to the primary intra-abdominal and pelvic tumors, excluding the sensitive structures from irradiation. This has been accomplished by a truly multidisciplinary effort comprising surgery, anesthesiology, OR nursing, administration, engineers, physicists, therapy technologists, and radiation therapists. Although follow-up is not yet sufficient to judge ultimate efficacy, acute and chronic severe morbidity is low and local control is good. There is justified enthusiasm for continuing the procedure. (Author abstract) (14 Refs)

37. CLINICAL EXPERIENCE WITH NITROIMIDAZOLES AS RADIOSENSITIZERS.

Dische S, Saunders MI, Anderson P, Stratford MR, Minchinton A

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Int J Radiat Oncol Biol Phys; 8(3/4):335-338 1982

Clinical experience with 248 patients given misonidazole (MIS) and 57 given desmethylmisonidazole (dmMIS) is reported. The pharmacokinetics of the two hypoxic cell sensitizers are reviewed and the relationship of the pharmacokinetic data to neurotoxicity discussed. dmMIS is well absorbed after po administration and good concentrations can be achieved in human tumors. Of 25 evaluable patients with various advanced primary or advanced recurrent or metastatic tumors given dmMIS, 17 showed complete tumor regression and 8 showed partial regression. Since a lower concentration of dmMIS than MIS reaches the cerebral spinal fluid, neurotoxicity was expected to be lower than with MIS. A high correlation was found between the area under the curve (AUC) relating plasma concentration with time and the incidence of neurotoxicity. Neurotoxicity was similar in patients given equal doses of dmMIS and MIS. With dmMIS, the most important factor was half-life, which correlated closely with neurotoxicity. Taking the AUC as a measure of tissue exposure, dmMIS is at least 2x as neurotoxic as MIS. A new radiosensitizing drug, Ro 03-8799, may have as high as a 5-to 10-fold advantage over MIS when radiosensitization is balanced against toxic effect. (5 Refs)

38. CLINICAL TRIALS OF WR-2721 WITH RADIATION THERAPY.

Blumberg AL, Nelson DF, Gramkowski M, Glover D, Glick JH, Yuhas JM, Kligerman MM

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Int J Radiat Oncol Biol Phys; 8(3/4):561-563 1982

Phase I clinical trials of the radioprotector WR-2721 [S-2-(3-aminopropylamino) ethylphosphorothioic acid] were carried out in 65 patients receiving palliative irradiation. The objective was to determine the maximum tolerated dose (MTD) of the drug given as a single dose or in multiple doses over several weeks. Fifty patients were treated with a single dose ranging from 25-910 mg/m2 iv and 15 received multiple doses of 100 mg/m2, 1-5 fractions per wk or 170 mg/m2, 3-4 fractions per wk. Acute toxicity observed in both groups included nausea, vomiting, hypotension, hypertension, and somnolence. In the single dose trial, all cases of emesis were of sudden onset. Emesis began towards the end of infusion and stopped within 2 hr after the end of infusion. In the multiple dose trial, two cases of emesis occurred several hr after infusion; these symptoms resolved within 48 hr after the drug was discontinued. Two patients undergoing radiotherapy and one chemotherapy, beeing treated with the multiple dose protocol exhibited allergic reactions including rash, hyperthermia, and one case of anaphylactic shock. For the single dose therapy the MTD has not yet been established; 740 mg/m2 appeared to be well tolerated. Only one patient successfully received 910 mg/m2. (5 Refs)

39. TREATMENT OF SUPERFICIAL HUMAN CANCEROUS NODULES BY LOCAL ULTRASOUND HYPERTHERMIA.

Marchal C, Bey P, Metz R, Gaulard ML, Robert J

Centre Alexis Vautrin, RN 74 Avenue de Bourgogne, 54500 Vandoeuvre les Nancy, France
Br J Cancer; 45(Suppl5):243-245 1982

Thirty-one superficial tumors (10 otorhinolaryngological carcinomas, 3 melanomas, 6 mammary carcinomas, 4 basal cell carcinomas, 4 lung carcinomas, 2 rectal carcinomas, 2 cervical adenocarcinomas) in 21 patients were subjected to hyperthermia alone or in combination with radiotherapy or chemotherapy. Hyperthermia alone induced one regression in 12 cases. Ultrasound hyperthermia combined with radiotherapy or chemotherapy produced nine regressions in 15 cases with thermoradiotherapy and four regressions in 4 cases with thermochemotherapy. Good thermal tolerance, even at sites previously irradiated with high-dose radiation, was noted. Twenty per cent of the patients felt pain at a distance from the heated site, near bone and nerves. The sensation of pain was dependent on the direction of the incident ultrasound beam. Two cases of marked progressive necrosis were observed with the association of hyperthermia and radiotherapy. Ultrasound appears to be a good means of inducing localized hyperthermia in superficial tumors and studying different sequences of hyperthermia application with irradiation or chemotherapy. (5 Refs)

40. THE EFFECT OF THERMAL CONDUCTION DURING LOCAL HYPERTHERMIA INDUCED BY ULTRASOUND: A PHANTOM STUDY.

Hynynen K, Watmough DJ, Mallard JR
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Br J Cancer; 45(Suppl5):68-70 1982

Phantom materials are described for determining temperatures achieved using ultrasound transducers. With phantom experiments, the effect of ultrasonic attenuation and thermal conduction can be studied. The temperature distributions during sonication, measured with small thermocouples, can be used to develop and test computer models to calculate the effect of thermal conduction if the thermal properties of the phantom are known. Thermal conduction appears to be important when focused ultrasound beams are used for the treatment of deep-lying tumors. (5 Refs)

41. TEMPERATURE DISTRIBUTION IN TISSUES SUBJECTED TO LOCAL HYPERTHERMIA BY RF INDUCTION HEATING.

Hand JW, Ledda JL, Evans NT
Medical Res. Council, Cyclotron Unit, Hammersmith Hosp., London W12 0HS, England
Br J Cancer; 45(Suppl5):31-35 1982

Tissue heating in the near field of a practical applicator consisting of a flat coil of three turns carrying a 27.12 megaHertz alternating current was examined. Temperature distributions were calculated such that temperatures within the tumor vol were 42 C or more. The radial variation in absorbed radiofrequency power density when the coil was scanned over the tissues at constant speed with an amplitude of +-5 cm is described. Steady state temperatures at several depths are shown as a function of radial distance for a small tumor (radius 1 cm, depth 2 cm). Because of the high blood flow assumed in the tumor, an unfavorable temperature distribution was produced. The temperature distribution for the larger two-zone tumor (2 cm radius x 2 cm depth), which was at a higher temperature than the skin, and at a given depth, greater than surrounding muscle, indicated that the absence of the poorly perfused central region resulted in a much smaller temperature differential between tumor and muscle. Variations in temperature with depth at three radial positions in and around the larger two-zone tumor are shown. Away from the tumor, peak temperature occurred close to the fat/muscle interface. At the center of the tumor, the peak occurred near the interface between inner and outer tumor regions. Forced cooling of the skin was simulated and steady state temperatures achieved in and around the larger tumor are described. Using the technique, peak temperatures were displaced to greater depths and the range of temperature was reduced. Considerable heat flux through superficial tissue associated with chilled water cooling was able to produce large temperature gradients in large tumors. (8 Refs)

PRE-CLINICAL STUDIES

42. INFLUENCE OF WR 2721 ON THE EFFICACY OF RADIOTHERAPY AND CHEMOTHERAPY OF MURINE TUMORS.

Clement JJ, Johnson RK
Experimental Therapeutics Section, Arthur D. Little, Inc., Cambridge, MA, 02140
Int J Radiat Oncol Biol Phys; 8(3/4):539-542 1982

Influence of WR 2721 in combination with radiation (0-3,000 rad) or antitumor agents was evaluated and possible therapeutic benefits of WR 2721 were estimated by comparison with normal tissue protection data. Two solid tumors, M5076 and Lewis lung carcinoma (LLC) were injected as 1:10 tumor brei into female C57Bl/6 x DBA/2 mice. The P388 lymphocytic leukemia ascites form was maintained ip in DBA/2 mice and was assayed in BALB/c x DBA/2 mice. WR 2721 at 500 mg/kg given 30 min prior to irradiation increased the survival curve (D0) values of ip P388 leukemia from 370 to 528 rad. WR 2721 also protected LLC from radiation. In general, WR 2721 reduced tumor regrowth delay at low radiation doses, and reduced tumor curability at higher radiation doses. WR 2721 protected mice against the toxic effects of cyclophosphamide (CYC) and melphalan (L-PAM). The LD50 for CYC and L-PAM in non-tumored mice was increased by 1.2 and 1.6 respectively, by pretreating mice with WR 2721 at doses of 300 or 500 mg/kg. The combination of 500 mg/kg WR 2721 with CYC against established M5076 tumor was no more effective than CYC alone at CYC doses of 210, 300, and 430 mg/kg. CYC at 614 mg/kg alone or in combination with WR 2721 was toxic. WR 2721 in combination with L-PAM was tested in early LLC and was found to be less toxic to tumor-bearing animals than L-PAM alone. WR 2721 protected systemic P388 leukemia from L-PAM at all L-PAM dose levels between 8.2-25 mg/kg. The therapeutic effectiveness of DNA binding agents in combination with WR 2721 was also evaluated in systemic P388 leukemia. At nontoxic levels the antitumor activity of etoposide and mitoxantrone given ip was not significantly altered by co-administration of 500 mg/kg WR 2721 given sc or ip. The combinations were, however, markedly more toxic. (9 Refs)

43. PROTECTIVE EFFECTS OF WR-2721 AGAINST RADIATION-INDUCED INJURY OF MURINE GUT, TESTIS, LUNG, AND LUNG TUMOR NODULES.

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Int J Radiat Oncol Biol Phys; 8(3/4):535-538 1982

The ability of S-2-(3-aminopropylamino) ethylphosphorothioc acid (WR-2721) to protect highly proliferative epithelium of jejunal crypts, testicular seminiferous tubuli, and low proliferative lung tissue of mice from acute radiation injury and the protection of murine fibrosarcoma microcolonies growing in the lung are described. WR-2721 (400 mg/kg, ip) given 30 min before irradiation (1,600 rad) of jejunum and 15 min before irradiation (1,400 rad) of testis, greatly protected jejunal crypts and testicular tubuli from radiation (RT)-induced cell depopulation. The mean number of cryptogenic cells/jejunal circumference of normal mice was approx 24,000, in irradiated mice 6.2 +-1 (standard error) and in WR-treated and irradiated mice 435 +-15. To determine whether WR-2721 can protect against RT-induced enhancement of lung nodules, 400 mg/kg was given to mice 30 min before local thoracic irradiation (LTI),

which was followed 1 day later by iv injection with 2 x 10(4) methylcholanthrene-induced fibrosarcoma (FSA) cells. While WR-2721 had no influence on the number of nodules formed 14 days later, RT increased the number of nodules by greater than 4x the control value. Four days after iv injection with 10(4) FSA cells, mice were treated with 400 mg/kg WR-2721 and 30 min later exposed to 1,000 rad LTI. RT greatly reduced the number of FSA nodules in the lung and WR-2721 reduced the tumor-destructive effect of RT. The RT only and RT plus WR-2721 data were significantly different from the nonirradiated control data using the Mann-Whitney U test (p less than 0.001). Using the same test, the number of nodules in the WR-2721 plus RT group differed significantly from the RT only group (P less than 0.004). (19 Refs)

44. THE EFFECT OF RADIOSENSITIZER PRETREATMENT ON THE RESPONSE OF THE RIF-1 MOUSE SARCOMA TO CYTOTOXIC DRUGS.

Twentyman PR, Workman P
MRC Clinical Oncology and Radiotherapeutics Unit, Hills Road, Cambridge CB2 2QH, England
Int J Radiat Oncol Biol Phys; 8(3/4):611-613 1982

The effect of radiosensitizer pretreatment on the response of RIF-1 mouse sarcoma in hind limbs of C3H/He mice treated with various cytotoxic drugs was investigated. Radiosensitizers studied included misonidazole (MISO), metronidazole (MET), desmethylmisonidazole (DMM), Ro 07-1902, imidazole, the drug metabolism inhibitor SKF 525A, and benznidazole (BENZ). Cytotoxic drugs used included cyclophosphamide (CY), melphalan (L-PAM), lomustine (CCNU), and chlorambucil (CHL), each administered ip. Dose modifying factors (DMF) for the response of clonogenic cells in the tumors were determined. Significant enhancement by MISO was seen with CCNU and CHL, and by MET only for CHL. Little if any enhancement of L-PAM was produced by MISO. Enhancement of CHL by MISO was by approx a factor of 2. For CCNU, no significant enhancement of growth delay by MISO was observed. A DMF of 1.2 for MISO (2.5 millimoles/kg) enhancement of CCNU lethality was determined. MISO did not, however, significantly enhance WBC count at day 3 after treatment with CCNU. For CHL, acute lethality DMF was 1.7-1.9 and WBC count DMF was 2.2. Ro 07-1902 and BENZO (1.0 millimole/kg) were as effective as MISO in enhancing CHL. DMM (2.5 millimoles/kg) was less effective than the same dose of MISO. Imidazole (2.5 millimoles/kg) and SKF 525A (0.13 millimoles/kg) were as effective as 2.5 millimoles MISO/kg. (9 Refs)

45. RADIATION DOSE FRACTIONATION STUDIES WITH HYPOXIC CELL RADIOSENSITIZERS USING A MURINE TUMOR.

Hill RP
Physics Div., Ontario Cancer Inst., 500 Sherbourne St., Toronto M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 8(3/4):483-485 1982

Ability of metronidazole (MET), misonidazole (MIS), desmethylmisonidazol (DMM), SR 2508, and SR 2555 to sensitize the KHT sarcoma to radiation treatment was compared. Tumors were grown in the left rear leg of male C3H mice. Radiosensitizers were given in doses of 0.25-1.5 g/kg. Single radiation doses or two different daily fractionation schedules were used (4 fractions of 5 Gray each or 7 fractions of 3 Gray each). Tumor cell survival was determined with either an in vivo or in vitro colony assay. Radiation was administered locally for 60-70 min (MET), or 30-40 min (other drugs) after iv (SR 2508, SR 2555) or ip (MET, MISO, DMM) injection. After irradiation, tumor cell survival decreased as the drug dose increased in the range of 0-0.75 g/kg for all drugs and all schedules. A plateau was then reached and the amount of sensitization remained relatively constant thereafter. In the plateau region, the reduction in survival was similar for single doses and 5-Gray fractions, but was less for 3-Gray fractions. The plateau was lowest for MISO, DMM, and SR 2508 with the 4 x 5 Gray fractionation schedule, higher for SR 2555, and much higher for MET. With the 3 Gray fractionation schedule, SR 2508 appeared to be slightly less effective than MISO and DMM, and MET was the least effective of the drugs tested. These results suggest that DMM and SR 2508 should be superior to MISO as clinical sensitizers; however, toxicity in humans remains to be established. (6 Refs)

46. RADIOSENSITIZATION OF THE RIF-1 MURINE FLANK TUMOR BY DESMETHYLMISONIDAZOLE (RO 05 9963) DURING INTERSTITIAL BRACHYTHERAPY.

Bernstein M, Gutin PH, Deen DF, Weaver KA, Levin VA, Barcellos MH
(c/o Editorial Office) Dept. Neurological Surgery, 350 Parnassus Ave., Suite 807, San Francisco, CA, 94117
Int J Radiat Oncol Biol Phys; 8(3/4):487-490 1982

The interaction of desmethylmisonidazole (DMM) with interstitial radiation was investigated with a clonogenic cell assay as the endpoint. Removable I-125 sources were implanted at right angles to the outer surface of RIF-1 tumors grown in the flanks of C3H/He mice. DMM was administered at a constant infusion rate of 3.0 ml/24 hr via an ip PE-50 catheter that was surgically implanted just prior to implantation of the I-125 source. Tumor and blood levels of drug were determined after sacrifice with high performance liquid chromatography. Mean tumor levels of DMM were 63.9 ug/g +-29.3 ug/g. Plasma levels were generally significantly higher than tumor levels by 200-500%. DMM levels in the more necrotic tumor centers were consistently equal to or greater than the less necrotic peripheries, suggesting that DMM is absorbed by hypoxic cells. No appreciable cytotoxicity was noted when DMM was administered alone over 8-60 hr. Comparison of survival curves for tumor cells from mice treated with brachytherapy alone and those treated with brachytherapy and DMM demonstrated sensitization with a dose-modifying factor of 1.6. Thus, in the RIF-1 murine flank tumor model, DMM enhances cytotoxicity of interstitially-delivered low dose-rate radiation. Use of this combination for treatment of neoplasia is possible. (15 Refs)

47. ENHANCEMENT OF THE POTENTIATION OF RADIOTHERAPY BY PLATINUM DRUGS IN MOUSE TUMOR.

Douple EB, Richmond RC
Radiobiology Lab., Norris Cotton Cancer Center, Mary Hitchcock Memorial Hosp., Hanover, NH, 03755
Int J Radiat Oncol Biol Phys; 8(3/4):501-503 1982

Two ways to enhance potentiation of radiation therapy (RT) by cisplatin (CP) were studied in MTG-B mouse mammary carcinoma, implanted in the legs of female C3H mice. The first approach determined the efficiency of treatment sequencing and the second combined CP and RT with drugs that protect normal tissues from CP damage, thus allowing use of larger concentrations of CP. CP, diethyldithiocarbamate (DDTC), 5-thio-D-glucose (5-TG), and 5-2-(3 aminopropylamino)ethylphosphorothioic acid (WR-2721) were dissolved in normal saline and injected ip. Mice were anesthetized with pentobarbi-

tol (60 mg/kg) 5 min prior to RT. X-irradiation was delivered locally to the tumor using a 2.0 cm diameter cone. The combination of CP and RT resulted in reduced TCD50 values with enhancement ratios greater than 1.3. Results suggested that greater potentiation occurred when CP was given 1 hr prior to RT compared to immediately following irradiation. CP 15 min before RT produced a more rapid tumor regression compared to CP injected immediately following RT. The addition of DDTC, WR-2721, or 5-TDG increased the CP LD50 values. Enhanced effects on the tumor occurred when 20 mg/kg CP and DDTC were combined with RT compared to tumor growth inhibition obtained with RT plus DDTC or CP plus DDTC. The marked effect on the radiation-derived TCD50 by CP administered prior to irradiation may be partly a result of a radiosensitization of hypoxic tumor cells by CP. (13 Refs)

48. TOXICITY OF DIETHYLAMINORESERPINE TO TUMOR CELLS: EFFECTS OF DRUG ALONE AND IN COMBINATION WITH RADIATION.

Lehnert S
Dept. Radiation Oncology, Montreal General Hosp., 1650 Cedar Ave., Montreal, H3G 1A4, Quebec, Canada
Int J Radiat Oncol Biol Phys; 8(3/4):505-509 1982

Cytotoxic effect of diethylaminoreserpine (DL-152) and the response of two transplantable tumors to combined treatment with radiation and DL-152 are described. KHT sarcoma was grown in male C3H mice, and the EMT6 mammary carcinoma was carried alternatively in BALB/c mice and in tissue culture. Changes in the surviving fraction of clonogenic tumor cells during the first 48 hr following DL-152 injection are shown. A fall in the surviving fraction of clonogenic cells for both tumors was noticeable, but the KHT had a larger reduction. Various doses of DL-152 were injected into tumor-bearing mice and the surviving fraction of clonogenic KHT cells was assayed 48 hr later. Significant reduction in surviving clonogenic tumor cells was found following doses as low as 5 mg/kg. The extent of reduction indicates that under these conditions, both hypoxic and aerated cells are killed by DL-152. Aerated KHT cells were completely resistant to 10(-4) M DL-152 over a 12-hr incubation period. Incubation of hypoxic cells in the same concentration of drug, however, reduced the surviving fraction to less than 10(-3), while 10(-5) M DL-152 was sufficient to kill 90% of hypoxic KHT cells over the same period. The use of DL-152 in conjunction with radiation was studied using im KHT tumors and growth delay as an index of response. The most effective protocol was found to be DL-152 injected shortly after irradiation. The relationship of duration of growth delay dose of DL-152 when the latter was given immediately after a given dose (1,350 rad) of irradiation is shown. It is concluded that DL-152 has a concentration-dependent specific toxicity for hypoxic cells and that the drug may require a hypoxic milieu to manifest toxicity. (12 Refs)

49. ULTRASONIC TREATMENT OF EXPERIMENTAL ANIMAL TUMOURS.

Kremkau FW
Dept. Diagnostic Radiology, Yale Univ. Sch. Medicine, New Haven, CT, 06510
Br J Cancer; 45(Suppl5):226-232 1982

Studies on the effects of ultrasound on several solid tumors in experimental animals have indicated that tumor growth rates can be reduced. These data are generally consistent with a thermal mechanism of action. Application of combined ultrasound and x-irradiation have shown that with some experimental animal tumors the radiation dose required to locally control 50% of the tumors can be reduced by ultrasound. These results were also consistent with a thermal mechanism of action hypothesis. Fractionated x-irradiation was not enhanced as much as single dose. Pulsing the ultrasound with the same time-av intensity resulted in the same radiosensitivity enhancement. The combined effects of ultrasound and cancer chemotherapy drugs have been studied in mouse leukemia. The treatment was applied in vitro with cells in suspension. Subsequent to treatment, the cells were inoculated into host mice and survival was monitored. Cytotoxic action of 5 of 10 drugs studied was enhanced by ultrasound. A thermal mechanism of action apparently was not involved. Cavitation in the saspension probably played a role in the cytotoxic enhancement. Experimental data are consistent with the concept that ultrasound causes rapidly reversible cell damage which, in the presence of cytotoxic drugs, is not so readily reversed and results in significant loss of lethal potential of the malignant cells to the host. (Author abstract) (15 Refs)

50. EXPERIMENTAL STUDIES ON REGIONAL THERAPY OF URINARY BLADDER CANCER. 3. EFFECTS OF HYPERTHERMIC IRRIGATION ON TRANSPLANTED BLADDER TUMORS IN RABBITS.

Nemoto R, Mori H, Iwata K, Abe R, Kato T, Harada M
Dept. Urology, Tsukuba Univ. Sch. Clinical Medicine, Niihara-gun, Ibaraki Prefecture, Japan
Nippon Hinyokika Gakkai Zasshi; 72(9):1129-1137 1981

Hyperthermic irrigation of the urinary bladder was performed in 54 male Japanese white rabbits bearing transplanted V2 carcinomas of the urinary bladder. Three indwelling venous catheters were inserted through a cystostomy into the lower portion of the bladder wall, extending about 2-3 mm into the lumen. Two of the catheters were used as outlets for the warmed saline soln entering the third catheter. Differences between tumor size in the experimental and control groups, effects of duration of irrigation on tumor size, changes in body wt due to irrigation, and pathohistological changes occurring in the bladder tumors were investigated. Av tumor size (length x width) 2 wk after treatment in control, normal thermia (36-38 C), and hyperthermia (42-44 C) groups were 395 +-31 mm2, 385 +-55 mm2, and 62 +-11 mm2, respectively; tumor size in the hyperthermia group was significantly (p less than 0.005) less those in the other two groups. Death due to the bladder tumors occurred by wk 7 in the control group and by wk 10 in the hyperthermia group. Body wt of the rabbits given hyperthermia increased from day 7-42 after transplantation (treatment began on day 3); body wt increased in the control rabbits from day 7 and decreased from day 28-42. Histologically, degeneration of tumors cells and infiltration of plasma cells and lymphocytes in the area of the tumor was observed in the hyperthermia group. The findings suggested that the hyperthermic irrigation of the urinary bladder can prevent tumor growth and prolong survival time with minimal damage to normal bladder mucosa. (20 Refs) (In JPN)

51. ALTERATION OF THE IMMUNE REACTIONS BY WHOLE-BODY AND LOCAL MICROWAVE HYPERTHERMIA IN NORMAL AND TUMOUR-BEARING ANIMALS. REVIEW OF OWN 1976-1980 EXPERIMENTS.

Janiak M, Szmigielski S
Centre for Radiobiology and Radioprotection, Warsaw, Poland
Br J Cancer; 45(Suppl5):122-126 1982

Alteration of both non-specific and specific immune functions in normal and tumor-bearing animals exposed to thermal

doses of microwave radiation (microwave hyperthermia: MwH) are reviewed. In general, whole-body MwH led to inhibition of various immune reactions, while local heating of tumor stimulated the function of macrophages and/or lymphocytes in tumor-bearing hosts. Usually, daily sessions of 2,450 or 3,000 megaHertz whole-body microwave radiation elevated rectal temperature by 3-4 C and inhibited growth of sarcomas 180 and L1. Later studies showed that although whole-body MwH led to temporary regression of sarcoma L1, the number of lung metastases was increased. Mice irradiated prior to tumor transplantation showed increased tumor growth and an increased incidence of spontaneous lung metastases. Diminished resistance to the formation of lung nodules could be adoptively transferred by bone marrow cells, but not by spleen or thymus cells, obtained from MwH-treated donors. MwH also inhibited in vivo phagocytosis and reactivity of immunocompetent T-lymphocytes. Irradiation of neoplastic tissue in tumor-bearing rats inhibited tumor growth and stimulated cell-mediated immunity. (14 Refs)

52. TEMPERATURE DISTRIBUTIONS IN TISSUES DURING LOCAL HYPERTHERMIA BY STATIONARY OR STEERED BEAMS OF UNFOCUSED OR FOCUSED ULTRASOUND.

Lele PP, Parker KJ
Lab. Medical Ultrasonics, Massachusetts Inst. Technology, Cambridge, MA, 02139
Br J Cancer; 45(Suppl5):108-121 1982

Temperature distributions resulting from insonation with stationary or steered beams of unfocused or focused ultrasound were measured in tissue-equivalent phantom, beef muscle in vitro, dog muscle mass, and transplanted murine tumors in vivo. Arrays of four to six thermocouples steeped through the vol of interest under computer control were used to measure the steady-state temperatures at 600 to 800 locations in both in vitro and in vivo experiments. The results were confirmed in spontaneous tumors in dog patients using fewer multi-thermocouple probes. Plane wave ultrasound was found to result in spatially non-uniform hyperthermia even in superficial tumors. The region of maximum temperature rise was small in extent and was situated at a depth which varied in the different models from 0.5 to 1.0 cm. Neither its location nor its extent could be varied by spatial manipulations of the transducer or by changing the insonation parameters except the ultrasonic frequency. A second region of hyperthermia was produced at depth by reflective heating if an ultrasonically reflective target, such as bone or air-containing tissue, was located below the target tissue. On the other hand, using available steered, focused ultrasound techniques, tumors (whether situated superficially or at depth) could be heated to a uniform, controllable temperature without undesirable temperature elevation in surrounding normal tissues. The use of steered, focused ultrasound permits deposition of energy to be tailored to the specific needs of each individual tumor. The small size of the focal region enables heating of tumors even when located near ultrasound reflecting targets. (Author abstract) (11 Refs)

REVIEWS

53. CLINICAL TRIALS OF HYPOXIC CELL SENSITIZERS.

Phillips TL, Wasserman TH, Stetz J, Brady LW
Dept. Radiation Oncology, Univ. California Sch. Medicine, San Francisco, CA, 94143
Int J Radiat Oncol Biol Phys; 8(3/4):327-334 1982

Phase I, II, and III clinical trials of misonidazole (MIS), a hypoxic cell sensitizer, are reviewed. Phase I studies established that MIS is absorbed well orally and that peripheral neuropathy is the major dose limiting toxicity. Efficacy studies in patients with multiple skin lesions or lung metastases have demonstrated that in each case, the response is greater in patients given MIS. Fourteen Phase II studies of MIS have been completed and three are ongoing. Closed studies involved gliomas, head and neck tumors, brain metastases, hemibody irradiation, advanced lung tumors, sarcoma/melanoma, bladder tumor, recurrent gliomas, advanced head and neck cancer, liver metastases, cancer of the esophagus, glioma (neutrons), and cancer of the cervix. In a limited number of patients in the Phase II studies, response was equal or better than that of historical controls. One large Phase III study has been completed using MIS in the treatment of malignant gliomas. To date, median survival has ranged from 40-48 wk with no significant differences between the protocol arms at the last date of analysis; further analysis and longer follow-up is necessary. Seven open Phase III studies are described. Again, no significant differences have yet been noted in any of the studies. In a total of 466 patients entered in Phase II studies and evaluated for toxicity, 28% experienced peripheral neuropathy and 7% CNS toxicity. The benefits of MIS are expected to affect only a few patients. However, Phase III studies are needed in a variety of tumor sites and histologies. (32 Refs)

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BREAST NEOPLASMS

1. RADIATION THERAPY WITH OR WITHOUT TUMORECTOMY AS TREATMENT FOR OPERABLE BREAST CANCER.

Calle R, Pilleron JP
Institut Curie, 75231 Paris, France
Rev Med Brux; 3(4):197-200 1982

Tumorectomy followed by radiation therapy constituted the treatment used for 233 patients who had infiltrating breast carcinomas less than or equal to 3 cm but no clinically pathologic nodes. Radiation therapy alone constituted the treatment for 896 patients who had larger tumors (greater than 3 cm to less than or equal to 7 cm) or who had clinically significant lymph nodes. Surgery was reserved for locoregional recurrence. At 5 yr, 207/233 tumorectomy patients were alive, without any signs of recurrence; of those still alive, 196 had not undergone mastectomy. At 10 yr, 120 tumorectomy patients were available for follow-up, were alive, without signs of recurrence; of those still alive, 82 had not undergone mastectomy. At 5 yr, 628/896 irradiation patients were alive, without any signs of recurrence; of those still alive, 299 had not undergone mastecto-

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my. At 10 yr, 376 irradiation patients were available for follow-up, among whom 173 were still alive, without any signs of recurrence; of those still alive, 91 had not undergone mastectomy. Only 20% of patients can be treated with the protocol of tumorectomy followed by irradiation, but it is recommended since the survival rate is fairly high and needless mastectomy is avoided. (6 Refs) (In FRE)

2. POSTOPERATIVE RADIOTHERAPY IN CANCER OF THE BREAST: EXPERIENCE AT THE JULES BORDET INSTITUTE.

Palikdjian D
Service de Radiotherapie, Institut Jules Bordet, Brussels, Belgium
Rev Med Brux; 3(4):205-207 1982

Among 787 patients receiving radiation therapy after surgery for breast cancer, the surgical procedure used for 419 was modified radical mastectomy; 9 out of the patients had radical mastectomy, and 344 had simple mammectomy. After 5 yr, the overall survival for all clinical stages of the tumor was 65%, and the recurrence-free survival was 55%. Regional recurrence occurred in only 50 of the cases. (no Refs) (In FRE)

3. COMPARISON OF ADJUVANT POSTOPERATIVE RADIOTHERAPY AND MULTIPLE-DRUG CHEMOTHERAPY (CMF-VP) IN OPERABLE BREAST CANCER PATIENTS WITH MORE THAN FOUR POSITIVE AXILLARY LYMPH NODES.

Chu AM, Kiel K
Dept. Therapeutic Radiology, Tufts-New England Medical Center, 171 Harrison Ave., Boston, MA, 02111
Cancer; 50(2):212-218 1982

With the advent of adjuvant chemotherapy in 1974 for early operable breast cancer at Massachusetts General Hospital, 41 patients with greater than or equal to four lymph nodes positive in their axillary dissection received a 2 yr course of the modified Cooper regimen (S + CH) between March 1974 and June 1976. The actuarial disease-free survival was found to be comparable to cyclophosphamide, fluorouracil and methotrexate as reported by Bonnadonna. No consistent randomization with a control group was possible. Since postoperative radiotherapy has been proven to decrease the incidence of local recurrence but does not affect survival; it was believed that this group should serve as an adequate control. Sixty patients with greater than or equal to four positive axillary lymph nodes in their axillary dissection who were given postoperative radiotherapy to the chest wall and draining lymphatics (S + RT) in 1973 and 1974 at the same institution were retrospectively analyzed and compared to the above group. Relatively little significant difference in survival and disease-free survival curves was found. At 48 mo, there was 72% and 58% survival for the S + RT and S + CH groups, respectively. When subgrouped according to age, those patients less than 49-yr-old had a 48-mo disease-free survival of 65% and 49% for S + RT and S + CH groups, respectively ($p = 0.25$). No significant difference was noted in the post menopausal group. In both groups, patients with greater than 50% positive axillary lymph nodes exhibited a poor prognosis. (Author abstract) (27 Refs)

CENTRAL NERVOUS SYSTEM NEOPLASMS

4. HIGH-DOSE RADIATION THERAPY WITH LOW-DOSE (PULSED) BCNU IN MALIGNANT GLIOMAS: AN EASTERN COOPERATIVE ONCOLOGY GROUP (ECOG) REPORT.

Salazar OM, VanHoutte PJ, Bennett JM, Rubin P, Wheeler KT
Dept. Radiation Oncology, Univ. Maryland at Baltimore, 22 South Greene St., Baltimore, MD, 21201
Int J Radiat Oncol Biol Phys; 8(5):915-919 1982

High-dose radiation therapy in combination with pulsed low doses of carmustine (BCNU) was studied in 12 patients (9 males, 3 females) with histopathologically confirmed malignant gliomas of the supratentorial brain regions. Details on the clinical course and therapy given for all patients are shown. Five patients were with Astrocytoma Grade III and seven with Astrocytoma Grade IV. The mean age for the former was 39 yr and for the latter group 52 yr. Most patients received prescribed radiation doses with the exception of a patient who died of disease midway through therapy. The av dose of BCNU given to the entire group was 94%. Radiation was well tolerated. No patient experienced pulmonary fibrosis or liver disfunction as a result of BCNU. The main effects of the drug were on hematologic parameters. No fatal or life-threatening hematologic toxicities were observed and only one patient exhibited severe leukopenia of 1,600 which recovered in 3 wk. The median survival for all patients was 80 wk. A significant difference was observed in median survival between patients with Astrocytoma Grade IV (30 wk) and patients with Astrocytoma Grade III (210 wk). All patients with Grade IV lesions died and four of the five patients with Astrocytoma Grade III were alive without evidence of disease. Three autopsies were performed among the eight deaths in the patients. In all patients tumor recurrence was observed at the initial locus without evidence of radiation-induced brain damage. (16 Refs)

5. TREATMENT EXPERIENCE. GLIOBLASTOMA MULTIFORME TREATED WITH 15 MEV FAST NEUTRONS.

Herskovic A, Ornitz RD, Shell M, Rogers CC
Div. Radiation Oncology, Duke Univ. Medical Center, Durham, NC, 27710
Cancer; 49(12):2463-2465 1982

Thirty-one patients with glioblastoma multiforme treated at the Middle Atlantic Neutron Therapy Association (MANTA) are reported. All but one patient completed a prescribed course of treatment, and most demonstrated clinical improvement. Mean survivals of 11.1 mo for Grade III neutron-treated patients and 6.8 mo for Grade IV patients were obtained. Persistent tumor in seven of eight patients was confirmed by biopsy or autopsy. (Author abstract) (16 Refs)

6. LONG TERM RESULTS OF CEREBELLAR ASTROCYTOMA WITH SPECIAL REFERENCE TO OPERATIVE PROCEDURE AND RADIOTHERAPY.

Tsuchida T, Fukuda M, Tanaka R
Dept. Neurosurgery, Brain Res. Inst., Niigata Univ., 1-754 Asahicho-dori, Niigata 951, Japan
Neurol Med Chir (Tokyo); 22(2):117-124 1982

Twenty-eight patients with cerebellar astrocytoma were treated between 1947 and 1980. There was one surgical death and two additional patients who died prior to posterior fossa surgery and were confirmed to have a cerebellar astrocytoma

by autopsy. Thus, 25 patients were available for follow-up analysis. The surgical procedures, histological findings and the efficacy of radiation therapy as well as the clinical symptoms and signs have been presented. Thirteen patients were under 15 years of age and 15 were over 16 years old. Eight patients died in the period from 9 months to 9 years after posterior fossa surgery. Out of a total of 28 patients, 17 have survived for 1 to 26 years, and 13 of the 17 survivors have survived 10 to 26 years after their tumors had been operated on. Among 15 patients who received partial excision of the tumor, eight are surviving and seven of them were irradiated. Four of the five patients who underwent subtotal excision are surviving. All of the five patients of total excision are surviving. All of the living patients were found to be in excellent or good neurological condition. Radiation therapy was performed on 18 patients after posterior fossa surgery. Among 17 patients whose tumors were not totally excised during surgery, 8 of 12 patients with radiation therapy are surviving, while only 1 of 5 patients without radiation therapy are surviving. Sixteen out of 19 patients whose tumors were diagnosed as piloid, fibrillary or spongioblastic astrocytoma histologically are surviving. However, only one of six patients whose tumors were diagnosed as protoplasmic, diffuse-type or anaplastic astrocytoma have survived. It is advocated that every effort should be made to extirpate the solid portion of the tumor as much as possible. However, if the tumor has invaded deeply into the brain stem or the floor of the fourth ventricle, surgical intervention should be stopped to avoid postoperative morbidity. Postoperative radiotherapy seems to have some effect on the prevention of recurrence of the tumor. (21 Refs) (In JPN)

7. EXTRACRANIAL METASTASES FROM INTRACRANIAL MENINGIOMA: A REPORT OF 2 CASES AND REVIEW OF LITERATURE.

Kinomoto H, Iwasaki Y, Nakagawa Y, Itoh T, Tashiro K, Abe H, Tsuru M, Higuchi M, Kaneda K
Dept. Neurosurgery, Univ. Sch. Medicine, Sapporo, Hokkaido, Japan
No Shinkei Geka; 10(3):319-326 1982

We report on two cases of intracranial meningioma with extracranial metastases, one of which is multiple, another, solitary, out of 190 meningiomas experienced in our Department for the past 22 years. Case 1: A 35-yr-old man developed headache and was diagnosed as the cerebellar tentorial meningioma, which was thought to be totally removed and postoperative course was uneventful. Six yr later he noticed limitation of neck movement, followed by chest pain. Multiple abnormal shadows were detected on roentgenogram of vertebra and the chest which were diagnosed as the metastatic meningioma by biopsy. He underwent irradiation therapy for whole spine and the lung. Pathological fracture occurred in the neck of the left femur in July 1979, left humerus in October. He underwent total hip replacement and fixation of the humerus. Bony specimen revealed the metastatic meningioma. Recurrence of the intracranial meningioma with invasion to the base of the skull were found on CT scan in April 1980, for which irradiation therapy was also given. He returned to his former job recently. Case 2: A 35 yr old man developed left hemiparesis in March 1971, and he was operated on for right parasagittal meningioma in July 1975. He underwent three more operations, all of which were diagnosed as the right falx meningioma. He complained of radiating pain in the back and the destruction of the ninth thoracic vertebra was recognized on tomogram. At this time he was unable to walk. In January 1980, surgical decompression was attempted, but most of the tumor was not removed because of the profuse bleeding. Surgical specimen at that operation was verified as a metastatic meningioma. Following irradiation therapy, the tumor was successfully removed. Postoperatively he was able to walk with a cane. Histological diagnoses of both cases were the hemangiopericytoma type of the angioblastic meningioma. We emphasize that irradiation therapy is effective for the extracranial metastatic meningioma. (26 Refs) (In JPN)

DIGESTIVE NEOPLASMS

8. ENDOSCOPIC PLACEMENT OF A MODIFIED TYGON TUBE PROSTHESIS FOR INTRALUMINAL IRRADIATION OF CARCINOMA OF THE ESOPHAGUS WITH IRIDIUM 195 (MEETING ABSTRACT).

Trujillo NP, Patel HR, Ling C, Wechsler-Jentzsch K, Rogers CC
George Washington University Hospital, Washington, DC
Gastrointest Endosc; 28(2):148 1982

There is a high incidence of recurrence of esophageal cancer following external beam irradiation. For recurrence with dysphagia, bougienage or placement of an esophageal prosthesis are alternative palliation. We have developed a means of palliation by locally irradiating biopsy proven recurrences in patients requiring repeated bougienage for dysphagia. A Tygon prosthetic tube was modified (MTT) with a core of 4 polyethylene tubes of similar length as the MTT surrounding another lung polyethylene tube used for loading iridium seeds. Attached to the top of the MTT are 2 lines used to anchor it to the nostrils, and attached to the bottom of the MTT is a mercury weight to prevent slippage. The modification allows a uniform circumferential administration of radiation, swallowing liquids during treatment, after-loading of the iridium and easy retrieval of the MTT. Patient discomfort during radiation is minimal. A Puestow guide wire is passed under direct vision. After swallowing the mercury weight, the ensemble consisting of MTT, pusher tube, Puestow straightener and stiffener is passed over the guide wire to the site. Placement is then checked by endoscopy and x-ray. Three patients with dysphagia from recurrent biopsy proven esophageal cancer who had previously received external beam irradiation were treated with intraluminal radiation over 72 hours (6000 to 3000 rads). X-ray, endoscopy and biospy at 2 and 8 weeks showed no recurrence. Dysphagia disappeared and there was esophageal lumen patency. Follow up has been 4 month to date. (no Refs)

9. THE USE OF IRRADIATION THERAPY IN THE TREATMENT OF TUMORS OF THE RECTUM AND RECTOSIGMOID.

Saxton JP, Withers HR, Romsdahl MM, Borgelt BB
Dept. Radiotherapy, M. D. Anderson Hosp. and Tumor Inst., Houston, TX, 77030
J Natl Med Assoc; 74(6):529-533 1982

As a means of increasing local control and disease-free survival in patients with carcinoma of the rectum and rectosigmoid, preoperative and postoperative irradiation therapy have been shown to be effective. The question of the sequence of delivering adjuvant radiation therapy is not settled; however, the benefits and deficits of irradiation therapy as an adjuvant to surgery preoperative and postoperative are reviewed. Basic principles of radiation oncology affecting the selection of the sequence and technique of treatment are discussed. (Author abstract) (25 Refs)

10. THE FLEXIBLE IMPLANT IN TREATMENT OF RECTAL CARCINOMAS.

Vider M, Lim N, Ditlow R, Au F, Gennaro AR
Dept. Radiation Oncology, Univ. Tennessee Center Health Sciences, Walter F. Chandler Building, 865 Jefferson Ave., Memphis, TN, 38163
J Surg Oncol; 20(3):157-160 1982

A modified technique for removable afterloading Iridium-192 implantation is described. Under local or general anesthesia, a series of flexible tygon tubes are introduced into all the tumor area in the rectum. This technique is especially suitable for palliation in high-risk, elderly patients. No rectal tube is necessary in this technique. (Author abstract) (11 Refs)

11. COMBINED SURGICAL-RADIOLOGICAL TREATMENT OF ANAL CARCINOMA.

Gross E, Eigler FW, Schulz U, Schere E
Chirurgische Universitatsklinik, Hufelandstrasse 55, D-4300 Essen, W. Germany
Chirurg; 53(5):323-324 1982

Anal carcinoma was treated in 29 patients (5 men and 24 women). Tumors were located in the anal canal in 18 patients and in the anal margin in 11. Tumors included 26 squamous epithelial carcinomas (SEC), 1 adenocarcinoma, 1 malignant melanoma (MM). and 1 basaloma. Thirteen SEC were keratinizing, 6 were slightly keratinizing, and 7 were nonkeratinizing. Ten patients underwent local excision of tumor and postoperative irradiation; the observation period was 2-6 yr. Two patients died of the tumors 9 and 14 mo after diagnosis. The patient with MM was treated palliatively; local and inguinal lymph node metastases were found 8 mo after treatment. Seven patients remained free of disease, including three for greater than 5 yr. Seven patients underwent abdominoperineal rectal extirpation (APRE); four of these also underwent postoperative irradiation. Four of the patients undergoing APRE died of tumor 5 mo-5 yr after diagnosis. One patient underwent irradiation for local recurrence of tumor. Two patients remained free of recurrence 2 and 16 mo after surgery. Twelve patients underwent irradiation only. Three patients died, including two after 14 mo. Two patients were lost to follow-up. One patient underwent palliative irradiation of an extensive carcinoma with lymph node metastases. Two patients required subsequent APRE. Five patients remained free of recurrent tumor after irradiation. Evidently removal of the anal sphincter does not improve the radicalness of surgery; the procedure is unnecessary in treatment of Stage I or II tumors. (15 Refs) (In GER)

12. TREATMENT OF ASYMPTOMATIC METASTATIC CANCER TO THE LIVER FROM PRIMARY COLON AND RECTAL CANCER BY THE INTRAARTERIAL ADMINISTRATION OF CHEMOTHERAPY AND RADIOACTIVE ISOTOPES.

Ariel IM, Padula G
137 East 36 St. Terrace, New York, NY, 10016
J Surg Oncol; 20(3):151-156 1982

Forty patients with asymptomatic metastatic cancer to the liver discovered at the time of laparotomy were treated by combined intrahepatic arterial chemotherapy and internal irradiation in the form of 90Yttrium microspheres. One group of 25 patients were treated by a catheter inserted at the time of operation and received 100 mCi; of 90Yttrium microspheres and 5-fluorouracil on a continuing basis. They survived an average of 26 mo (varying from 9 to 60 mo). The second series of 15 patients referred after surgery were treated by the percutaneous insertion of the catheter into the hepatic artery and received a bolus of combined chemotherapy consisting of Platinol, Methotrexate, and 5-fluorouracil. They survived an average of 31 mo, which varied from 12 to 60 mo. The dose of 100 mCi of 90Yttrium was well tolerated by the liver. Prospective studies are in progress, limiting the treatment to the internal irradiation to determine its precise role in the overall treatment of metastatic cancer to the liver. (Author abstract) (33 Refs)

13. POSTOPERATIVE IRRADIATION OF CARCINOMA OF THE HEAD OF THE PANCREAS AREA. SHORT-TIME TOLERANCE AND RESULTS TO PRECISION HIGH-DOSE TECHNIQUE IN 18 PATIENTS.

Nguyen TD, Bugat R. Combes PF
(c/o Bugat) Dept. Therapeutic Radiology, Centre Claudius Regaud, 11, rue Piquemil, 31052 Toulouse Cedex, France
Cancer; 50(1):53-56 1982

During the period from January 1977-August 1979, 18 patients with biopsy-proven pancreas duct or ampullary adenocarcinoma with no distant or liver metastases underwent external beam radiation therapy following laparotomy. With the use of a 25 MEV photon beam and a four field 'box' technique, the dose delivered to the target volume identified with radiopaque clips at laparotomy was 6,000 rad in 6 wk, while largely sparing the spinal cord, kidney, liver and gut. All patients subjected to low fat, gluten free diet completed treatment as planned without any acute reaction. Three patients developed delayed pancreatic insufficiency. According to actuarial survival analysis and low morbidity such an approach may lead to increased survival in patients with pancreatic cancer. (Author abstract) (13 Refs)

14. METHODOLOGICAL APPROACHES TO INDIVIDUAL PLANNING OF MEGAVOLTAGE RADIOTHERAPY IN CANCER OF THE PANCREATODUODENAL REGION.

Pronin VI, Morozov AI, Rozanov IuL, Zverev MP, Prilepo VN
N. A. Semashko Medical Stomatological Inst., Moscow, USSR
Med Radiol (Mosk); 27(5):32-36 1982

Indications for high-energy radiotherapy in cancer of the pancreatoduodenal region are outlined, and results of the use of 25 million electron volts beta therapy in 12 men (39-68 yr old) with unresectable tumors are reported. During palliative surgery (formation of biliodigestive anastomosis), the patients were subjected to marking of the primary tumor and of regional metastases. Radiotherapy was started on day 25 after the palliative surgery: the patients received split-course irradiations from two opposite lateral fields (150-200 rads/day, 5x/wk, total dose 5,500-7,500 rads). At the time of report (12 mo later), all patients were alive. (13 Refs) (In RUS)

GENITOURINARY NEOPLASMS

15. CYSTOTOMY AND PEROPERATIVE IRRADIATION FOR BLADDER CANCER: LONG-TERM RESULTS.

Appelqvist P, Salmo M
Dept. Radiotherapy and Oncology, Univ. Central Hosp., Haartmaninkatu 4, 00290 Helsinki 29, Finland
J Surg Oncol; 20(2):75-79 1982

The long-term results were investigated in 46 patients of bladder cancer treated by cystotomy and peroperative irradia-

tion. This combination therapy appears to produce grossly comparable long-term survival results with surgery and radiotherapy. There were 10 complications during a 10-yr period after the treatment. We think that cystotomy and peroperative irradiation could still be used for the treatment of bladder cancer especially when the tumor is not too large, is situated at the base of the bladder, segmental resection cannot be performed, and the patient wants to spare the bladder function. (Author abstract) (13 Refs)

16. MEGAVOLTAGE RADIATION THERAPY IN CARCINOMA OF THE PENIS.

Sharma U, Rath GK, Singhal RM, Sharma LK, Prakash A
Dept. Radiotherapy, All India Inst. Medical Sciences, New Delhi, India
Int Surg; 67(1):69-71 1982

The clinical profile of 84 cases of carcinoma of the penis are reviewed. A practical radiation technique for megavoltage beam units is described. Complete ablation of the tumor in 18 of 20 (90%) patients in a radically irradiated group suggests a tumor ablation dose of 5,500r in 17 fractionation treatments. (Author abstract) (11 Refs)

GYNECOLOGIC NEOPLASMS

17. TREATMENT OF ENDOMETRIAL CARCINOMA WITH RADIATION THERAPY ALONE.

Abayomi O, Tak W, Emami B, Anderson B
Tufts-New England Medical Center, 171 Harrison Ave., Boston, MA, 02111
Cancer; 49(12):2466-2469 1982

Of 393 patients treated at Tufts-New England Medical Center for endometrial carcinoma from 1968-1977, 66 patients underwent radiation therapy alone because of medical contraindications to surgery. The median age for this group was 70 yr. The patient distribution was Stage I (39), Stage II (11), and Stage III and IV (16). Therapy consisted of pelvic irradiation to a dose of 4,000-5,000 rad followed by an intrauterine radium application (3,000-5,000 mg hr) and a vaginal radium application (2,000-4,000 rads to the surface). Local control was achieved in 37 of 50 patients with Stages I and II disease with a 3-yr actuarial survival of 78%. Patients with Stages III and IV disease had a median survival of 15 mo; 4 of 16 patients survived for 36 mo. In this group of patients, bleeding, pain, and vaginal discharge was palliated. Four patients in the series had treatment-related bowel complications requiring colostomy. This is an effective method of treatment for endometrial carcinoma patients who are not surgical candidates. (Author abstract) (10 Refs)

18. WHOLE PELVIC IRRADIATION IN STAGE I ENDOMETRIAL CARCINOMA: CHANGES IN NUMBERS AND REACTIVITIES OF SOME BLOOD LYMPHOCYTE SUBPOPULATIONS.

Onsrud M
Tissue Typing Lab., Rikshospitalet, Natl. Hosp., Oslo, Norway
Gynecol Oncol; 13(3):283-292 1982

Peripheral blood lymphocytes of 64 operated, Stage I endometrial carcinoma patients were tested for natural killer (NK) activity, mitogenic (PHA) responsiveness, and distribution of surface markers. Sequential studies showed an 83% reduction of lymphocyte numbers immediately after 4,000 rad whole pelvic irradiation. T cells were relatively more sensitive to in vivo irradiation than NK cells. The long-term effects were studied in patients belonging to a clinical trial and who were either randomized to radiotherapy or not. Three to 5 yr after treatment, the irradiated patients showed increased NK activity and a greater fraction of lymphocytes bearing receptors for the Fc part of immunoglobulin G, as compared to controls. Conversely, lymphocytes from radiotherapy patients showed a depressed PHA responsiveness, which could be attributed to T-cell depletion. When investigated 9-12 yr after treatment, the results of functional tests and cell enumerations were similar for the two treatment groups. It is concluded that this radiotherapy regime causes long-lasting, although transitory, depletions of certain blood lymphocyte subpopulations. On a per cell basis, however, the lymphocytes have retained their functional capacity. (Author abstract) (21 Refs)

19. A PHASE I STUDY OF MISONIDAZOLE AND PELVIC IRRADIATION IN PATIENTS WITH CARCINOMA OF CERVIX.

Thomas GM, Rauth AM, Black BE, Cummings BJ, Sorenti VL, Bush RS
Dept. Radiation Oncology, Ontario Cancer Inst., Princess Margaret Hosp., Toronto, Ontario M4X 1K9, Canada
Br J Cancer; 45(6):860-868 1982

A Phase I study of oral daily misonidazole (MISO) with conventional pelvic irradiation, has been conducted in patients with carcinoma of the cervix Stages IB, IIB, IIIB and IVA. MISO was administered in daily dosages to sequential groups of patients at doses of 0.15 g/m2, 0.30 g/m2 or 0.45 g/m2 for 22 days over 5 wk. Sixteen patients were assigned to each dose level. Using a double-blind randomization, they received either placebo (3/16) or MISO (13/16). The major dose-limiting toxicity was peripheral neuropathy (PN). None of the 13 patients receiving 0.15 g/m2 or the 13 receiving 0.3 g/m2 developed PN. However, 6/13 at the 0.45 g/m2 level (total dose less than or equal to 9.9 g/m2) developed PN. Additional patients were entered at this level and a total of 13/26 developed PN, which was considered of clinically significant severity in 9. Symptoms of PN have persisted from 1 wk to 10 mo, and have been completely reversed in 9/13 patients. Pharmacological parameters were examined for correlation with clinically evident toxicities. Although peak plasma MISO levels and half-lives did not correlate significantly with PN, there was a significant correlation between the calculated 'area under the curve' (AUC) and PN. No correlation exists between PN and total urinary excretion of MISO or the O-demethylation product. A daily dose of 0.45 g/m2; MISO (total dose less than or equal to 9.9 g/m2) is considered to produce an acceptable level of toxicity for this patient population. (Author abstract) (18 Refs)

20. VALUE OF COMPUTER TOMOGRAPHY IN THE STUDY OF DOSE DISTRIBUTION IN INTRACAVITARY CURIETHERAPY.

Cionini L, Renzi R, Andreucci L, Pirtoli L, Pacini P, Mungai R
Istituto di Radiologia dell'Universita, Policlinico Careggi, 50134 Florence, Italy
Radiol Med (Torino); 68(4):267-274 1982

Patients with carcinomas of the uterine cervix were subjected to computer tomographic examinations soon after the insertion of the uterovaginal applicators. The tomographic information was transferred into an integrated system for optimization of treatment planning, and dose distributions were obtained di-

rectly superimposed to the tomographic sections. (10 Refs) (In ITA)

HEAD AND NECK NEOPLASMS

21. PROTON BEAM IRRADIATION OF UVEAL MELANOMAS. RESULTS OF 5-1/2-YEAR STUDY.

Gragoudas ES, Goitein M, Verhey L, Munzenreider J, Urie M, Suit H, Koehler A
Retina Service, Massachusetts Eye and Ear Infirmary, 243 Charles St., Boston, MA, 02114
Arch Ophthalmol; 100(6):928-934 1982

Proton beam irradiation was used in the treatment of 76 uveal melanomas from July 1975 to December 1980. Five (7%) were small, 32 (42%) were medium, and 39 (51%) were large melanomas. The follow-up period ranged from 2 mo to 5-1/2 yr; 19 patients were followed up for more than 2 yr and 39 were observed for more than a yr. Tumor regression has been achieved in all eyes with more than 12 mo of follow-up except one, which was enucleated because of secondary complications. Three patients in whom metastatic disease developed died. Our data indicate that proton irradiation can be used for the treatment of relatively large lesions that previously were considered untreatable and reduces the high ocular morbidity experienced with other methods in the treatment of medium and small melanomas. (Author abstract) (31 Refs)

22. HELIUM ION THERAPY FOR CHOROIDAL MELANOMA.

Char DH, Castro JR, Stone RD, Irvine AR, Barricks M, Crawford JB, Schatz HA, Lonn LI, Hilton GF, Schwartz A, Quivey JM, Saunders W, Chen GT, Lymon JT
Ocular Oncology Unit, S-315, Univ. California, San Francisco, CA, 94143
Arch Ophthalmol; 100(6):935-938 1982

Forty patients with choroidal melanomas received radiation therapy with helium ion-charged particles. Thirty-six of 40 patients either remained stable or demonstrated tumor shrinkage. Seventeen of 18 patients followed up for at least 1 yr after therapy demonstrated tumor regression, with a mean tumor shrinkage of approx 40%. The most effective method of choroidal melanoma management is unclear. Charged-particle external-beam irradiation may be more applicable and have less ocular morbidity than either radioactive plaques or photocoagulation. (Author abstract) (20 Refs)

23. NASOPHARYNGEAL CARCINOMA IN CHILDHOOD.

Lombardi F, Gasparini M, Gianni C, De Marie M, Molinari R, Pilotti S
Istituto Nazionale per lo Studio e la Cura dei Tumori, Via Venezian 1, 20133 Milan, Italy
Med Pediatr Oncol; 10(3):243-250 1982

We have retrospectively evaluated a series of 27 consecutive children observed from 1965 to 1980 with nasopharyngeal carcinoma (NPC). Histological diagnosis in each patient was undifferentiated carcinoma of nasopharyngeal type (UCNT) with prominent lymphocytic infiltration. Regional node involvement was present in 26 of 27 patients and 2 children presented with distant metastases. Twenty evaluable children with primary nasopharyngeal tumor with or without positive cervical nodes underwent radiotherapy (RT) with uniform criteria in technique. Adjuvant cyclophosphamide (CPM) was administered to a total of 11 children. The actuarial relapse-free survival and overall survival are 40% and 55% at 4 yr, respectively. In this series, the most important prognostic factor was represented by the extent of the tumor in the nasopharynx. Permanent control of the primary tumor was obtained in 85% of patients. CPM given after RT did not reduce the incidence of relapse. However, the fact that 45% of patients developed distant metastases as first treatment failure suggests that combined chemotherapy should be tested in the management of NPC in children, especially when primary tumor is locally advanced. (Author abstract) (39 Refs)

24. CARCINOMA OF THE PARANASAL SINUSES.

Bush SE, Bagshaw Ma
(c/o Bagshaw) Dept. Radiology, Div. Radiation Therapy, Stanford Univ. Sch. Medicine, Stanford, CA, 94305
Cancer; 50(1):154-158 1982

Thirty-eight patients with carcinoma of the paranasal sinuses received primary therapy consisting of external beam megavoltage irradiation alone or in combination with surgery at the Stanford University Medical Center, Division of Radiation Therapy, during the period between 1956-1974. Doses of radiation ranged from 5,560 rad over 5-1/2 wk to 8,050 rad over 7 wk. Relapse free survival is 37% and absolute survival 32% at 5 yr. Twenty of 38 patients developed local failure and four patients died with metastatic disease but local control. Serious complications included two cases each of osteoradionecrosis and optic nerve injury. The data are analyzed regarding dose, radiotherapeutic technique, patterns of relapse and complications. (Author abstract) (14 Refs)

25. ADENOCARCINOMA OF THE PARANASAL SINUSES IN TASMANIA.

Franklin CI
Peter MacCallum Clinic, Hobart, Tasmania
Australas Radiol; 26(1):49-52 1982

A survey was made of all the hospital records in Tasmania of cases of tumor of the paranasal sinuses presenting between 1966 and 1978 inclusive. Twenty cases were discovered, of which 13 were adenocarcinoma. Of the 13 cases of adenocarcinoma, 9 were woodworkers, and another worked with wood as a hobby. None of the other patients were woodworkers. Assuming 4,000 people are at risk per annum, this incidence is 250 per million per annum, against an expected of not more than 10 per million per annum. Radiotherapy has been the mainstay of treatment, with doses ranging from 57 Gray in 26 fractions over 6 wk to 60 Gray in 18 fractions over 4 wk. Those that have done best have had about 60 Gray over 6 wk, followed by major surgical resection. Survival is poor, with 50% survival at 2 yr. There is an extremely high incidence of adenocarcinoma involving the ethmoids and upper antrum in Tasmania. This is confined almost exclusively to men working in the timber industry. The prognosis is poor, but a combination of radiotherapy and surgery offers the best chance of cure. (Author abstract) (5 Refs)

26. CURIETHERAPY OF ORAL CANCER.

Volterrani F, Chiesa F, Molinari R
Istituto Nazionale Tumori, Via G. Venzian 1, 20133 Milano, Italy
Tumori; 68(2):119-125 1982

This work concerns 406 oral carcinomas treated with curietherapy (interstitial applications and surface molds) from January 1959 to December 1970. There were 65 (16.0%) carcino-

mas of the mucosal surface of cheeks, 15 of the retromolar areas, alveolus and gingiva, and hard palate (3.7%), 211 of the mobile tongue (51.9%), and 115 of the floor of mouth (28.4%). There were 132 (32.5%) T1 cases, 245 (60.3%) T2 and 29 (7.2%) T3. In 376 cases with adequate follow-up (92.6%) there were 93 (24.7%) local relapses: 83 isolated and 10 associated with a lymph nodal relapse; 49.5% of the local relapses were peripheral with respect to the treated volume (46/93). The incidence of local relapses only slightly differed from initially T1 and T2 cases (respectively 21.8% and 22.7%), whereas it was more than twice as much for initially T3 cases (53.6%). The overall incidence of radionecrotic complications was 22.0% (83/376 cases with adequate follow-up). Altogether the disease-free survival was 41.1% and 31.4% at 5 and 10 yr, respectively. We think that local control of practically all treatable oral carcinomas can be obtained with a combined treatment. (Author abstract) (20 Refs)

27. COMBINED CHEMOTHERAPY WITH DOXORUBICIN, BLEOMYCIN, VINBLASTINE, DACARBAZINE, AND RADIOTHERAPY FOR ADVANCED LYMPHOEPITHELIOMA.

Galligioni E, Carbone A, Tirelli U, Veronesi A, Trovo MG, Magri MD, Crivellari D, Roncadin M, Frustaci S, Tumolo S, Grigoletto E
Div. Radiotherapy and Medical Oncology, Ospedale Civile, 33170 Pordenone, Italy

Cancer Treat Rep; 66(5):1207-1210 1982

Twelve consecutive patients with advanced lymphoepithelioma and no previous chemotherapy or radiotherapy were observed in our division between January 1975 and December 1980. Primary treatment of 11 evaluable patients with doxorubicin (adriamycin), bleomycin, vinblastine, and dacarbazine (ABVD) for at least three cycles resulted in complete remission (CR) in 4 patients; partial remission with a greater than 50% reduction of tumor volume in 4; partial remission with a less than 50% reduction of tumor volume in 1; and no response in 2. With the addition of radiotherapy in doses of 4,500-6,000 rad to the primary tumor and the bilateral laterocervical lymph node chains, the combined treatment resulted in CR in eight patients. At 27 mo the median duration of CR in these patients has not been achieved, and the median survival has not been achieved at 32 mo. (Author abstract) (16 Refs)

28. EFFICACY OF PROTECTIVE INTRAORAL DEVICES IN RADIOTHERAPY OF MALIGNANT TUMORS OF THE MAXILLOFACIAL REGION.

Vorob'ev IuI, Nurmagomedov AM, Sarantseva IP
N. A. Semashko Medical Stomatological Inst., Moscow, USSR

Med Radiol (Mosk); 27(4):15-20 1982

To reduce the radiation injuries of mouth mucosa, protective dental devices were used during the radiotherapy of 90 patients (68 men, 22 women; 86 were greater than 40 yr old) with malignant tumors of the maxillofacial region. The patients were subjected to daily irradiations at 200-250 rads, total dose 5,500-7,000 rads. Occlusion devices provided an effective protection of mouth mucosa against the secondary irradiation. The symptoms of local epithelites were observed only after irradiation with relatively high doses of 4,800-5,300 rads. (11 Refs) (In RUS)

29. RESULTS OF BRACHYTHERAPY FOR CANCER OF THE TONGUE WITH SPECIAL EMPHASIS ON LOCAL PROGNOSIS.

Horiuchi J, Okuyama T, Shibuya H, Takeda M
Tokyo Medical and Dental Univ., Yushima, 1-5-45, Bunkyo-ku, Tokyo 113, Japan

Int J Radiat Oncol Biol Phys; 9(5):829-835 1982

Treatment results of radiotherapy for carcinoma of the tongue including limits for brachytherapy (BT) were analyzed in 166 patients (96 males, 70 females, 21-81 yr old, av 55 yr) with carcinoma of the tongue to define criteria of BT. Thirty-four patients had T1, 83 had T2, and 49 had T3 lesions according to the TNM system. Forty-seven of 166 (28.3%) patients had lymphadenopathy. Treatment modalities were mainly interstitial implant with or without external beam irradiation, except for early lesions which were treated with intraoral electron beam therapy. Actuarial survival rates for the 166 patients were 78.9%, 60.5%, and 55.6% after 1, 2, and 3 yr, respectively. For the grade of the primary lesion the 5-yr survival rates were 67.1% for T1, 62.5% for T2, and 30.3% for T3 lesions. The local recurrence-free rates were 94% in T1, 77% in T2, and 32% in T3 lesions, respectively. Among the patients with T1 and T2 lesions treated with intracavitary irradiation, 87% (13/15) and 75% (3/4), respectively, were free of disease. Except for four patients with T2 lesions, no recurrence was noticed during the 2-yr follow-up. Radium-needle implants were performed in 29 patients of whom 27 (93%) had their disease completely controlled. No patient developed severe complications in either the mucosa or mandible. Transient mucosal ulcer was noticed in 12 patients, but 11 recovered spontaneously within 6 mo. Thus, although 20 patients (19%) out of the 103 patients who survived more than 2 yr after the initial treatment developed complications subsequent to the radiation, only 3% had moderate (++) complications. (13 Refs)

30. PRIMARY TREATMENT OF EPITHELIOMA OF THE LIP.

Curioni C, Padula E, Maraggia A
Divisione di Chirurgia Maxillo-Facciale Unita Sanitaria, Locale n. 8 Presidio Ospedaliero San Bortolo, Vicenza, Italy

Minerva Stomatol; 31(2):173-188 1982

Of 75 patients with epithelioma of the lip, 70 were cured by means of surgery and/or radiotherapy; the primary lesion proved to be resolvable in 59 of the patients. Follow up studies showed the absence of recurrent tumors over an extended period of time. In 16 patients, who presented particularly large lesions, the local recurrences that were observed were subsequently treated by means of radical surgery; further lesions did not develop after the radical surgery, and thus the actual rate of recovery rose to 86.7%. Results of the study demonstrated that radiotherapy is a successful method of treatment for T1 and T2 lesions, while surgery, alone or in combination with radiotherapy or a more aggressive approach, offers statistically better results with T3 and T4 lesions. Epithelioma of the lip is a neoplasm that affects elderly patients. The onset of epithelioma is closely related to cofactors (smoking, alcohol, or exposure to UV). Epitheliomas tend to localize on the lower lip and at present are easily curable with modern medicine when the lesions are not extensive. (49 Refs) (In ITA)

31. THE MANAGEMENT OF PAROTID LYMPH NODE METASTASES BY IRRADIATION.

Wang CC
Dept. Radiation Medicine,, Massachusetts General Hosp., Boston, MA, 02114
Cancer; 50(2):223-225 1982

An analysis of 28 patients with parotid nodal metastases from carcinomas treated by radiation therapy at the Massachusetts General Hospital was made. Of 24 patients treated more than 24 mo previously, the NED survival and local tumor control rates were 54% and 75%, respectively. For the early lesions with disease limited to the parotid nodes, the local control rate was 83% following radiation therapy. A modified staging system for nodal metastases to this particular site is presented. (Author abstract) (8 Refs)

32. EXTERNAL RADIOTHERAPY OF CANCER OF THE THYROID (MEETING ABSTRACT)

zum Winkel K
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J Cancer Res Clin Oncol; 103(Suppl):A39 1982

By external (percutaneous) radiotherapy the survival of patients with cancer of the thyroid is improved. For external radiotherapy photons or electrons are used. In planning radiotherapy computer-tomography is performed. In the thyroid region we apply 15 MeV electrons. The radiation field is extended to the cervical lymph nodes, thyroid bed and if suspected to the cranial portion of the mediastinal lymph nodes. For equal radiation of the cervical region we prefer the teletherapy with cobalt-60. For the region of the primary tumor and the regional lymph nodes 60-70 Gy are administered. The palliative doses for metastases is 40-50 Gy. Indicated for radiotherapy are patients with primary or metastatic tumors of the thyroid failing in radioiodine uptake and patients with thyroid cancer which cannot be removed. Postoperative radiation therapy is indicated in patients with anaplastic carcinoma, sarcoma, mixed type of carcinoma, non-Hodgkin lymphoma and metastases to the thyroid of breast or cervic carcinoma. Palliative radiotherapy is concerned in bone metastases for prevention of fracture or in obstruction of the spinal cord. In 38 patients with removed thyroid cancer and failing radioiodine uptake the postoperative radiation therapy resulted in a 5 year survival rate of 87 percent. In more progressive stages (13 patients) or even in distant metastases (30 patients) the 5 year survival rates were 38 or 13 percent, respectively. However, in 23 patients with anaplastic carcinoma or sarcoma the 5 years survival rate was only 4 percent. Sixty-six patients had percutaneous radiotherapy exclusively, 20 percent survived 5 years. (no Refs)

33. RADIATION THERAPY WITH TWICE A DAY FRACTIONATION.

Touboul E, Chenal C, Nizri D, Chaillet MP, Alseoudi M, Szpirglass H, Marneur M
Centre des Tumeurs, C.H.U. Pitie-Salpetriere, 47, boulevard de l'Hopital, F-75013 Paris, France
Bull Cancer (Paris); 69(2):167-169 1982

Sixty-five patients (62 men, 3 women; 35-80 yr old) with head and neck neoplasms were treated with split-course radiotherapy. Cobalt 60 irradiation was administered in two series of irradiation separated by an interval of 14 days. In each series, 30 Grays was administered in 10 treatments over five days. In each of the two daily treatments, separated by 4-6 hr, 3 Grays were administered. Mucosal tolerance for radiation studied in 55 patients was not related to previous treatment or lack of treatment with antineoplastic agents. Gastric intubation was required in 9 patients, 3/24 of patients who had received previous chemotherapy and 6/41 of those who had received no chemotherapy. Three complications resulted from split-course radiotherapy: in two cases, edema of the pharyngolaryngeal junction required a nasogastric tube and in one case, a fracture of the lower jaw occurred 3 mo after the end of radiotherapy. Of the 25/32 patients with squamous cell carcinoma of the floor of the mouth, 11 showed no sign of local recurrence 18 mo after treatment. Of the 7/10 patients with carcinoma of the retromolar fornix available for follow-up at 18 mo post-therapy, 2 showed local control of tumor. (9 Refs) (In FRE)

34. COMBINATION CHEMOTHERAPY USED PRIOR TO RADIATION THERAPY FOR LOCALLY ADVANCED SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK.

Tannock I, Cummings B, Sorrenti V, Beale F, Clark R, Harwood A, Fitzpatrick P, Keane T, Payne D, Rider WD, Blackstein M, Osoba D, Bryce D
Princess Margaret Hosp., Ontario Cancer Inst., 500 Sherbourne St., Toronto M4X 1K9, Canada
Cancer Treat Rep; 66(6):1421-1424 1982

Thirty-three patients with locally advanced squamous cell carcinoma of the head and neck were scheduled to receive two courses of chemotherapy prior to radical radiotherapy. Chemotherapy consisted of moderate-dose methotrexate with leucovorin rescue, bleomycin by infusion, and cisplatin. Loss of body wt and the duration of membrane formation at a specified region of the oral cavity during radiation therapy were used as indices of radiation toxicity: there was no excessive loss of body wt or mucosal reaction in patients who received combined treatment compared to patients in a nonrandomized control group who received radiotherapy alone. Twenty patients (60%) had a greater than or equal to 50% decrease of measurable disease prior to starting irradiation, but only eight patients (24%) are alive and disease-free at a median follow-up of 16 mo. Aggressive chemotherapy does not prevent delivery of subsequent full-dose radiotherapy for squamous cell carcinoma of the head and neck, but this study does not suggest that chemotherapy has a great beneficial effect on long-term survival. (Author abstract) (6 Refs)

35. DENTAL CARE FOR CANCER PATIENTS RECEIVING RADIOTHERAPY TO THE HEAD AND NECK.

Fleming TJ
Dept. Dental Oncology, Univ. Texas, M. D. Anderson Hosp. and Tumor Inst., Houston, TX
Cancer Bull; 34(2):63-65 1982

The team approach to dental care of the cancer patient receiving radiotherapy to the head and neck is discussed. The primary objective in such dental care is to minimize or prevent treatment-associated complications. Complications of radiotherapy most frequently encountered include xerostomia, mucositis, dermatitis, photosensitivity, fibrosis, trismus, radiation caries, abnormal bony development, and osteoradionecrosis. Preirradiation management involves the formulation of a realistic dental treatment plan based on a thorough clinical and radiographic evaluation and patient education. Dental management in the postirradiation phase involves periodic reevaluation for possible recurrence of new pathological conditions, management of possible treatment sequelae, prosthodontic rehabilitation, and evaluation of patient compliance with the preventive dental program. (11 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

36. COMBINED RADIO- AND CHEMOTHERAPY IN STAGE IIB AND III HODGKIN'S DISEASE.

Herrmann T, Fleischer J, Lesche A, Wolf H
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Dtsch Gesundheitswes; 37(7):303-307 1982

The author reports on the retrospective evaluation of treatment courses in 64 patients suffering from Hodgkin's disease Stages IIB, IIIA and IIIB. A comparison is made between patients who had received radiation therapy only and those with combined radiological-chemotherapeutic treatment. The following conclusions may be drawn: (1) In Stage IIB 5-yr results of the group with combined therapy and the group with radiation treatment only are the same (75% with a 5-yr survival rate). However, the group treated with chemotherapeutics in addition, shows the better prognosis during the first 4 yr after starting therapy. Thus additional chemotherapy may only be omitted in cases where pretherapeutic explorative laparotomy has confirmed the presence of Stage IIB, where there is a favorable histological subtype and when after radiation therapy no signs of activity of the disease can be detected. (2) In Stage IIIA results of the group with combined treatment (5-yr survival rate 66%) are clearly better than in patients who received radiation only (29%). Additional chemotherapy has to be administered here with exact scheduling of the various forms of therapy being left open for decision by the medical experts concerned. (3) In Stage IIIB, radiation therapy as an additional measure to chemotherapy as the main form is a necessity (5-yr-survival rate 33%). (4) These results urgently require interdisciplinary cooperation as regards the therapeutic plan for the patient with Hodgkin's disease. The author reports on 'lymphoma counseling' as a possible and valuable form of such cooperation. (Author abstract) (17 Refs) (In GER)

37. CORONARY HEART DISEASE MORTALITY AFTER IRRADIATION FOR HODGKIN'S DISEASE.

Boivin JF, Hutchison GB
Dept. Epidemiology and Health, McGill Univ., 3775 Univ. St., Montreal, Quebec H3A 2B4, Canada
Cancer; 49(12):2470-2475 1982

The authors conducted a study designed to evaluate the hypothesis that irradiation to the heart in the treatment for Hodgkin's disease (HD) is associated with increased coronary heart disease (CHD) mortality. This report describes 957 patients diagnosed with HD in 1942-75 and analyzes follow-up findings through December 1977. Twenty-five coronary heart disease deaths have been observed, and 4,258.2 person-yr of experience at risk have been accrued. The relative death rate (RDR), defined as the CHD mortality for heart-irradiated subjects divided by the mortality for nonirradiated subjects, was estimated. After adjustment for the effect of interval of observation, age, stage, and class, the RDR estimate is 1.5 but does not differ significantly from unity (95% confidence limits: 0.59, 3.7). (Author abstract) (12 Refs)

38. TREATMENT OF MALIGNANT LYMPHOMAS OTHER THAN HODGKIN'S DISEASE. INFLUENCE OF HISTOLOGICAL TYPE.

Kenis Y, Vanderlinden B, Bron D
Service de Medecine, Institut Jules Bordet, Brussels, Belgium
Rev Med Brux; 3(4):243-248 1982

The treatment of malignant lymphomas other than Hodgkin's disease is based both on the stage of the disease and on the histological type. Favorable histological types such as well differentiated lymphocytic lymphoma, Waldenstrom's macroglobulinemia, and nodular lymphomas are characterized by slow evolution and eventual death despite apparently effective therapy. In Stages I and II of the favorable histological types, radiotherapy eradicates the disease in about 90% of cases, and the majority of relapses are in nonirradiated areas. Unfavorable histological types include undifferentiated lymphocytic lymphoma, diffuse histiocytic lymphoma, Burkitt's lymphoma, and lymphoblastic lymphoma that has a particularly poor prognosis. For Stage I and II patients with unfavorable histology, treatment should consist of radiotherapy followed by supplemental chemotherapy. Patients in more advanced stages benefit from a combination of chemotherapeutic agents, preferably including adriamycin. Even more intensive therapy similar to those used for the acute leukemias are necessary for the treatment of lymphoblastic lymphoma. To manage medullar aplasia that may arise from massive chemotherapeutic doses delivered for resistant lymphoblastic lymphoma, healthy bone marrow should be saved out at the time of diagnosis so that autologous bone marrow graft may be delivered in the event of such aplasia. (35 Refs) (In FRE)

39. COMBINATION CHEMOTHERAPY (CVP OR CHOP)-RADIOTHERAPY APPROACH IN EARLY STAGE NON-HODGKIN'S LYMPHOMAS.

Comella P, Scoppa G, Abate G, Comella G, Apice G, Castello G, Pergola M, Giordano GG, Coucourde F, Zarrilli D
Istituto dei Tumori, Cappella dei Cangiani, 80131 Napoli, Italy
Tumori; 68(2):137-142 1982

From January 1978 to December 1980, 42 patients with early stage non-Hodgkin's lymphoma other than of the gastrointestinal tract were treated with radiotherapy and combination chemotherapy. Eighteen patients in Stage I were submitted to locally extended-field radiotherapy up to a mean dose of 48 Gy with a Co60 source and, after a 3-wk rest period, to six cycles of combination chemotherapy. Twenty-four patients in Stage II received three cycles of combination chemotherapy before and after irradiation, the same as for Stage I. Combination chemotherapy consisted of cyclophosphamide, vincristine and prednisone (CVP) for 15 cases with favorable histology (3 NWDL, 1 NPDI, 11 DWDL), whereas it included cyclophosphamide, adriamycin, vincristine and prednisone (CHOP) for 27 cases with unfavorable histology (20 DPDL, 3 DM, 4 DH). Complete remission (CR) was achieved in 35/42 (83%) patients, with a highly significant difference between Stage I (100%) and Stage II (71%). After 42 mo of follow-up, the probability of survival for all patients was 72%. Survival was better for Stage I (88%) than for Stage II (68%) and for favorable histology (87%) as compared to unfavorable histology (70%). Furthermore, survival was highly influenced by response to therapy. Indeed, actuarial survival rate for CR was 91% as compared to a median survival time of 10.2 mo for the remaining patients. Four patients, all with poor histology, relapsed after 5-24 (mean 11) mo of CR. Only one of them had an extension in extranodal sites and eventually died, despite the salvage treatment utilized. In our experience, locally extended-

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field irradiation combined with chemotherapy gave a high proportion of CR and seemed to prevent relapses, particularly in extranodal sites. (Author abstract) (32 Refs)

40. MARROW TRANSPLANTATION FOR ACUTE NONLYMPHOBLASTIC LEUKEMIA IN FIRST REMISSION USING FRACTIONATED OR SINGLE-DOSE IRRADIATION.

Thomas ED, Clift RA, Hersman J, Sanders JE, Stewart P, Buckner CD, Fefer A, McGuffin R, Smith JW, Storb R
Dept. Medicine, Div. Oncology, Univ. Washington Sch. Medicine and Fred Hutchinson Cancer Res. Center, 1124 Columbia St., Seattle, WA, 98104
Int J Radiat Oncol Biol Phys; 8(5):817-821 1982

Fifty-three patients with acute nonlymphoblastic leukemia transplanted in first remission were irradiated (1,000 rad total body irradiation, one exposure with 200 rad one each of 6 days). The patients characteristics and the outcome are summarized. The chemotherapy given to the patients prior to referral for marrow transplantation varied according to the protocol at the referring institution. No apparent difference in the acute toxicity of the two applied regimens was observed. The immediate causes of death are listed. (24 Refs)

MUSCULOSKELETAL NEOPLASMS

41. RADIOTHERAPY WITH SURGERY FOR SALVAGE FOR PERIPHERAL EWING'S SARCOMA (MEETING ABSTRACT).

Kliman M, Harwood AR, Fornasier VL
No affiliation given
J Bone Joint Surg [Br]; 64(2):258 1982

The authors studied the survival, local recurrence rates and limb function of 22 patients with Ewing's sarcoma peripheral to the elbow or knee. The primary treatment had consisted of moderate dose radiotherapy, surgery being reserved for the salvage of failures of irradiation. Five of the 22 patients had had a local recurrence after irradiation: two died, two had been salvaged (one by amputation and one by re-irradiation), and one patient had had a palliative amputation. Eleven patients were alive and well with an average follow-up of eight years, nine having been controlled by primary irradiation and two by salvage irradiation or surgery. Eleven had died of metastases. The functional results of treatment were assessed in the 11 survivors, of whom nine had normal function, one had a significant leg length discrepancy, and one had had an amputation. No radiation-induced sarcomata had been observed. They concluded that moderate doses of radiation with surgery for salvage provided a good rate of cure with an excellent functional result. (no Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

42. UNEVEN PREOPERATIVE IRRADIATION IN COMBINED TREATMENT OF LUNG CANCER.

Klimenko AA, Kharchenko VP, Karibov IuI, Losev SI, Pokas LV
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 27(5):36-39 1982

Therapeutic efficacy of preoperative distant gamma therapy was studied in 50 patients (47 men, 3 women; 45-60 yr old) with lung cancer. Among these patients, 7 were in Stage I, 29 were in Stage II, and 14 were in Stage III; 27 patients had central tumors and 23 had peripheral tumors. Histologically, 9 had adenocarcinomas, and 41 had squamous cell carcinomas. The patients received daily irradiations from 2-3 fields (single dose 300 rads, 5x/wk, total focal dose 3,600 rads), followed by surgery (pneumonectomy) 10-14 days later. The preoperative radiotherapy caused an improvement in the general state of the patients (decrease or disappearance of pain, dyspnea, and cough). X-ray examination showed tumor regression in 66% of the patients. The efficacy of the radiotherapy did not depend upon tumor localization or histology. The incidence of postoperative complications did not exceed that after surgery alone. Morphological examination of surgical specimens showed complete tumor regression in 1, marked radiation necrosis in 17, mild radiation necrosis in 27, and slight radiation necrosis in 5. The 1-, 2-, 3-, and 4-yr survivals were 84%, 67,2%, 55.1%, and 55.1%, respectively. All patients were free of recurrences. (10 Refs) (In RUS)

43. RADIOTHERAPY OF LUNG CANCER PATIENTS WITH III DEGREE OF PULMONARY INSUFFICIENCY.

Zhakov IG, Goncharova IM, Zhakova LA, Rebrikova ID
Res. Roentgenoradiological Inst., Moscow, USSR
Med Radiol (Mosk); 27(4):6-9 1982

Efficacy of radiotherapy was studied in 52 patients with inoperable epidermoid lung carcinoma complicated by the III degree of pulmonary insufficiency. Among these patients, 40 had central tumors and 12 had peripheral tumors. The patients received split-course irradiations (200 rads/day, total dose 6,600-7,000 rads, with 3-4-wk interval after 3,000-3,200 rads). Prior to the treatment, the patients showed significant impairment of the respiration function. Of 52 patients, 47 completed radiotherapy, while in 5 irradiations were discontinued due to development of distant metastases. Improvement of the respiratory function was observed in 19/47 patients. Improvement of the spirographic parameters was achieved in 13/24 patients with lung atelectasis and in 6/23 patients without atelectasis. The 1-and 3-yr survival rates were 58% and 12%, respectively. (5 Refs) (In RUS)

44. NON-CROSS-RESISTANT CHEMOTHERAPY AND CONSOLIDATION RADIOTHERAPY FOR SMALL CELL CARCINOMA OF THE LUNG.

Young JA, Dillman RO, Seagren SL, Taetle R, Rentschler RE, Lee JW, Lehar TJ, Green MR, Stanton W, Mendelsohn J, Royston I (c/o Dillman), Veterans Admin. Medical Center, 3350 La Jolla Village Dr., V-111 E, San Diego, CA, 92161
Cancer Treat Rep; 66(6):1399-1401 1982

Fifty-six patients with small cell carcinoma of the lung were treated with a two-cycle induction course of hexamethylmelamine, vincristine, doxorubicin, and cyclophosphamide. Patients

with limited disease (LD) who responded and patients with extensive disease (ED) who had a complete response received prophylactic whole-brain radiotherapy, as well as radiotherapy to thoracic and abdominal sites of disease. Concurrently with radiotherapy, consolidation chemotherapy was given with doxorubicin, cyclophosphamide, methotrexate, and etoposide. The complete response rate was 35% for ED patients and 68% for LD patients. The median survival time for complete responders was 54 wk for ED patients and 65 wk for LD patients. The toxicity of the program was moderate, and the effectiveness was comparable to that of other reported combined-modality treatment programs. (Author abstract) (9 Refs)

45. LIMITED SQUAMOUS CELL CARCINOMA OF THE LUNG: A SOUTHWEST ONCOLOGY GROUP RANDOMIZED STUDY OF RADIATION WITH OR WITHOUT DOXORUBICIN CHEMOTHERAPY AND WITH OR WITHOUT LEVAMISOLE IMMUNOTHERAPY.

White JE, Chen T, Reed R, Mira J, Stuckey WJ, Weatherall T, O'Bryan R, Samson MK, Seydel HG
Southwest Oncology Group, Operations Office, c/o Cancer Treatment and Res. Center, 4450 Medical Dr., San Antonio, TX, 78229
Cancer Treat Rep; 66(5):1113-1120 1982

In 1976, the Southwest Oncology Group activated a four-arm randomized study of limited squamous cell carcinoma of the lung. The purpose of this study was to determine if doxorubicin and/or levamisole added to radiation therapy improved the local control rate and survival in patients with limited squamous cell carcinoma of the lung. Of the 107 eligible patients, 15 (14%) had complete responses and 20 (19%) had partial responses. When compared by chemotherapy, immunotherapy, and performance status, no statistically significant difference was found in response rates or in survival. Although not statistically significant, the survival and response rates of patients in the combined levamisole arms were shorter than those of patients in the combined arms not containing levamisole. Patients receiving radiation therapy alone had the best survival. The irradiated field was the site of failure in 68 (88%) of the 77 patients in whom the site of failure was specified. Fifty (65%) of the patients failed in the radiation therapy field only. Chemotherapy and/or immunotherapy as employed in this protocol were of no benefit. (Author abstract) (33 Refs)

46. COMBINATION CHEMOTHERAPY-RADIOTHERAPY WITH AND WITHOUT THE METHANOL-EXTRACTION RESIDUE OF BACILLUS CALMETTE-GUERIN (MER) IN SMALL CELL CARCINOMA OF THE LUNG. A PROSPECTIVE RANDOMIZED TRIAL OF THE PIEDMONT ONCOLOGY ASSOCIATION.

Jackson DV, Paschal BR, Ferree C, Richards F, Muss HB, Cooper MR, White DR, Stuart JJ, Spurr CL, Wells B, Sartiano G, McFarland J, McCulloch J
Bowman Gray Sch. Medicine, Wake Forest Univ., South Hawthorne Road, Winston-Salem, NC, 27103
Cancer; 50(1):48-52 1982

The effect of addition of the nonspecific immunostimulant, MER, to combined treatment with chemotherapy and radiotherapy in small cell carcinoma of the lung was evaluated in a prospective randomized trial involving 102 evaluable patients. Chemotherapy consisted of cyclophosphamide, Adriamycin, vincristine, methotrexate, and lomustine; and radiotherapy was administered to the primary lesion, mediastinum, supraclavicular areas, and whole brain. Of 47 patients administered MER 400 mcg intradermally every 6 wk, 12 (26%) attained complete remission with a median survival of 22.9 mo. Complete remission was observed in 17 (31%) of 55 patients who received no MER with a median survival of 20.0 mo (p greater than 0.05). Survival greater than or equal to 2 yr has been observed in five patients who received MER and two patients who did not receive MER. The response rate and duration, survival, and toxicity of the two treatment arms were similar with the exception of cutaneous and occasional systemic reaction to MER. MER as used in this study has not influenced the overall results of a combined modality treatment program for patients with small cell carcinoma of the lung. (Author abstract) (13 Refs)

47. RESULTS OF CHEMORADIOTHERAPY OF POORLY DIFFERENTIATED AND UNDIFFERENTIATED LUNG CANCER.

Abiatov KhA
Regional Oncological Dispensary, Gur'ev, USSR
Med Radiol (Mosk); 27(4):9-15 1982

The results of chemoradiotherapy in 126 patients (111 men, 15 women; 32-75 yr old) with poorly differentiated and undifferentiated lung cancer are reported. Nine patients had peripheral tumors and 117 had central tumors; 4 were in Stage II, 55 were in Stage III, and 67 were in Stage IV. All patients received distance gamma therapy: 200 rads/day, 5x/wk (82 patients) or 350-400 rads/day, 3x/wk (44). Of 126 patients, 45 (Group 1) received gamma therapy in combination with cyclophosphamide (1g, iv, 1x/wk). 41 (Group 2) received gamma therapy in combination with 5-fluorouracil (250 mg, 2 hr prior to small-fraction irradiation, or 500 mg, between the large-fraction irradiations), and 40 (Group 3) received gamma therapy alone. Complete tumor regression was achieved in 26.7% of the patients in Group 1, 17.1% of the patients in Group 2, and in 7.5% of the patients in Group 3. Immediate results of the treatment did not depend upon the method of dose fractionation. Local side-effects were more frequent after large-fraction irradiation. Av duration of survival in Groups 1, 2, and 3 was 14.5 mo, 14.8 mo, and 7.8 mo, respectively. (8 Refs) (In RUS)

48. EFFECTS ON PULMONARY FUNCTION OF WHOLE LUNG IRRADIATION FOR WILMS' TUMOUR IN CHILDREN.

Benoist MR, Lemerle J, Jean R, Rufin P, Scheinmann P, Paupe J
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Thorax; 37(3):175-180 1982

The effect of whole lung irradiation on lung function was investigated in 48 children treated for Wilm's tumor with pulmonary metastases. Lung function tests were performed before irradiation and were repeated annually for as long as possible, the length of follow-up varying from 2 to 17 years. A reduction in both lung volume and in dynamic compliance was clearly observed. In some patients these changes occurred in the early post-irradiation months, but in most the decrease observed progressed over longer periods of time. Static pressure volume curves, blood-gases, and carbon monoxide transfer were normal. These findings make it unlikely that postirradiation pulmonary fibrosis was involved. Another explanation for the decreased lung volume and dynamic compliance might be failure of alveolar multiplication. Muscular injury is unlikely as the patients were able to produce normal transthoracic pressures. A failure of chest wall growth is also possible and would explain the progressive restrictive impairment but not the early lung function changes. It is suggested that the early effects detected in some patients were the result of lung injury and that

later effects resulted from impaired chest wall growth. (Author abstract) (19 Refs)

PRE-CLINICAL STUDIES

49. LOCAL HYPERTHERMIA THERAPY OF MALIGNANT BRAIN TUMOR USING RADIOFREQUENCY - EFFECTS ON SUBCUTANEOUSLY TRANSPLANTED EXPERIMENTAL BRAIN TUMOR.

Kim T, Tanaka R, Suzuki Y, Sekiguchi K, Yamada N, Saito Y
Dept. Neurosurgery, Brain Res. Inst., Niigata Univ., 1-757 Asahicho-dori, Niigata 951, Japan
Neurol Med Chir (Tokyo); 22(2):103-110 1982

Anti-tumor effects of radiofrequency hyperthermia on experimental malignant glioma of rats were examined. Radiofrequency electromagnetic fields at 13.56 MHz were used to heat locally subcutaneously-transplanted Rous sarcoma virus-induced rat gliomas. Temperature profiles during radiofrequency treatment showed that the temperature in the tumor was constantly higher by 2 to approx 5 C than that in the surrounding subcutaneous tissue. The tumor temperature was maintained at a stable level throughout the treatment by adjusting the radiofrequency power. Following results were obtained: (1) The critical temperature to bring anti-tumor effects such as delay of tumor growth or extension of the survival of the animals was 43 C. (2) Longer or repeated heating enhanced the anti-tumor effects. (3) Combined therapy consisting of radiofrequency hyperthermia and 60Co-irradiation or an anticancer drug, ACNU (1-(4-amino-2-methyl-5-pyrimidinyl) methyl-3-(2-chloroethyl)-3 nitrosourea), showed greater anti-tumor effects than hyperthermia only. (Author abstract) (37 Refs) (In JPN)

50. EFFECT OF HYPERTHERMIA ON HYPOXIC CELL FRACTION IN TUMOR.

Song CW, Rhee JG, Levitt SH
RAdiation Biology Section, Dept. Therapeutic Radiology, Univ. Minnesota Medical Sch., Box 494 Mayo, Minneapolis, MN, 55455
Int J Radiat Oncol Biol Phys; 8(5):851-856 1982

Effect of hyperthermia on the hypoxic cell fractions and the response of tumors to subsequent radiation were investigated in the SCK mammary carcinoma of A/J mice. The survival curve for tumors of the air-breathing animals showed a diphasic response consisting of an initial slope at the lower doses and a more gradual slope at the higher doses. The degree of displacement of the survival curves of tumor cells irradiated at 3, 5, 12, and 24 hr after heating at 43.5 C for 30 min suggested a dynamic change in the hypoxic cell fraction in tumors after hyperthermia. The hypoxic fraction increased steadily after hyperthermia reaching close to 0.95 at 5 hr posthyperthermia. The increase was statistically significant. The hypoxic fraction then decreased to approx 0.6 at 12 hr and remained at the same level at 24 hr post-heating. The hypoxic fraction at 24 hr post-heating was statistically smaller than that at 5 hr, but was not significantly different from the hypoxic fraction in the unheated control tumors. The clonogenic cell number in SCK tumors prior to heating was 49.3 x 10(6) cell/g; 22.2 x 10(6) cells/g were hypoxic. The numbers of total clonogenic and hypoxic cells decreased respectively to 1.29 x 10(6) cell/g and 1.23 x 10(6) cell/g 5 hr after hyperthermia. Results showed that the tumor cells which survived the heat damage were more radiosensitive than the cells in unheated control tumors during 3-5 hr post-heating. However, at 12 and 24 hr after hyperthermia, the tumor cells appeared to be slightly radioresistant relative to the unheated control tumor cells. (38 Refs)

51. THERMAL DISTRIBUTION OF MAGNETIC-LOOP INDUCTION HYPERTHERMIA IN PHANTOMS AND ANIMALS: EFFECT OF THE LIVING STATE AND VELOCITY OF HEATING.

Storm FK, Harrison WH, Elliott RS, Silberman AW, Morton DL
Univ. California, 54-140 CHS, Los Angeles, CA, 90024
Int J Radiat Oncol Biol Phys; 8(5):865-871 1982

Patterns of energy deposition in static homogenous and heterogenous normal tissue equivalent and animal normal tissue phantoms were evaluated and the internal thermal distribution provided by magnetic induction in live, healthy animals was delineated. Radio-frequency magnetic-loop applicators were used. Results of placing the homogeneous animal tissue phantom concentrically and acentrically, and of placing the heterogeneous animal tissue phantom concentrically within the magnetrode are shown. Dead animal extremity phantom demonstrated preferential peripheral heating similar to that observed in tissue equivalent and artificial homogeneous and heterogeneous animal tissue phantoms, though altered heat distribution was noted in some areas. With moderate (250 watts) heating over 10 min, all surface tissues in living animal models remained within a physiologically tolerable temperature range, with nearly uniform heating of peripheral internal (liver, kidney) and central internal (spleen) organs. In contradistinction to the observation in phantoms, potentially tumoricidal temperatures greater than or equal to 42 C occurred in both peripheral and central organs to a nearly equivalent degree in the live animal. However, significant injurious peripheral organ heating was observed within a central 'cold spot' similar to that in phantom models. Results from magnetic-loop induction hyperthermia in live, healthy animals suggested that magnetrode hyperthermia can provide safe and effective deep heat. (14 Refs)

REVIEWS

52. RADIOTHERAPY TREATMENT PLANNING.

Mould RF
Dept. Medical Physics, Westminster Hosp., London, England
Med Phys Handb (7): 204 pp., 1982.

External beam radiotherapy treatment planning is reviewed, with emphasis on the diagrammatic representation of radiation dose patterns from different combinations of radiation fields. The method has been adopted because similar dose shapes are obtained for similar beam configurations, regardless of the size of the anatomical cross section. Superficial and deep therapy, megavoltage x-ray machines, and megavoltage cobalt-60 machines are described. Exposure, absorbed dose, and activity of radiation units are presented. The first 1 cm, central axis, off-axis regions, lead shielding, wedge filters, and obliquity and inhomogeneity problems of the single isodose curve are discussed. The multiple-field isodose curve pattern is considered with respect to isodose curve notation; patient outline and localization of the target vol; two-, three-, four-, five-, and six-field plans; beam direction; rotation therapy; mantle treatment fields; and treatment simulation. External beam therapy machines, electron beam isodose curves, and plans in electron beam therapy are discussed. Constant focus-skin distance/

source-skin distance treatment calculation using percentage depth doses, constant source-axis distance treatment calculation using tissue/air ratios, and two-target vol treatments are presented. Manual addition of isodose curves, a topic sometimes ignored due to the availability of computerized radiotherapy treatment planning systems but one which is nevertheless a useful teaching aid and also a prerequisite for certain examinations, is described. (no Refs)

53. NUCLEAR PARTICLES IN CANCER TREATMENT.

Fowler JF
Gray Lab., Mount Vernon Hosp., Northwood, Egnland
Med Phys Handb (8): 178 pp., 1982.

Recent progress in the treatment of cancer patients using nuclear particle accelerators is reviewed. Radiobiological and physical principles are outlined, and various types, sources, and properties of the particle beam are described. Methods of treating cancer are discussed, including methods other than radiotherapy (RT), current developments in RT, and methods of dealing with hypoxic cells in tumors. Types of radiation and their sources are considered, including neutrons, fast-neutron RT, deuterium-tritium generators, cyclotron production of fast-neutron beams, charged particle accelerators, proton beams, other ion beams, design for dedicated medical ion accelerators, pi meson production, and the spallation neutron source. Absorbed dose and kerma, methods of measuring neutron dose, properties of neutron beams investigated by dosimetry, and dose measurements for heavy charged particle beams and for negative pions are presented. Clinical experience with fast neutrons, charged particles, negative pi mesons, and general problems in clinical trials of cancer treatment are discussed. Cost of neutron, charged particle, and pion installations is presented. Radiobiological and physical properties of beams available for RT are discussed. Heavy charged particle RT is expected to improve RT because further improvements in depth dose distributions permit delivery of higher doses to the target vol containing the tumor and/or lower doses to surrounding normal tissues; biological advantages are expected from the use of densely ionizing radiation. (112 Refs)

54. PROTON BEAM THERAPY.

Verhey LJ, Munzenrider JE
Dept. Radiation Medicine, Massachusetts General Hosp., Boston, MA, 02114
Ann Rev Biophys Bioeng; 11:331-357 1982

Physical properties and biology of proton beams (PB), clinical physics, clinical PB radiation therapy, and fractionated radiation therapy of human malignancies are reviewed. Dose depth distributions, inhomogeneities, scattering effects, and absolute dose determination are discussed. The facilities and treatment planning techniques currently used by the Harvard Cyclotron Laboratory-Massachusetts General Hospital group are described; similar considerations are applicable to the general problem of treatment planning for heavy ion or proton radiation therapy at other facilities. Because protons are predominantly a low linear energy transfer radiation modality with radiobiological effectiveness (RBE) only slightly greater than unity, human clinical trials are considered justified; the rationale for such trials is that the improved dose distributions possible with PB therapy result in better rates of local control in human malignancies. Results of fractionated human radiotherapy with PB are summarized. Experience with 272 patients treated with fractionated proton therapy at the Harvard Cyclotron confirms that PB therapy in humans is feasible and can be conducted without untoward or unexpected acute or chronic normal tissue reactions. Normal tissue and tumor responses observed in the patients were consistent with an RBE of 1.1 for protons relative to 60Cobalt gamma rays. PB therapy is thought to be the treatment of choice for medium and large uveal melanomas and for para-CNS sarcomas abutting critical normal structures. (42 Refs)

55. FAST NEUTRON RADIATION THERAPY.

Cohen L, Awschalom M
Neutron Therapy Facility, Fermilab, Batavia, IL, 60510
Ann Rev Biophys Bioeng; 11:359-390 1982

Physical characteristics, dosimetry, and generation of neutron beams (NB); modern clinical facilities; neutron radiobiology; relative biological effectiveness and oxygen enhancement ratio; clinical implications; role of the oncology data base; and results of NB therapy are reviewed. The primary impact of ionizing radiation is on the reproductive integrity of cells. Sharply defined and specific endpoints can be identified in intact tissues when depletion of their constituent cell populations reaches a critically low value. Tumors unlikely to respond to conventional doses of radiation therapy can be identified by histological type, extent of disease, and contiguity with radiosensitive or critical organs. Radioresistant tumors include the adenocarcinomas of the gastrointestinal tract, soft-tissue and bone sarcomas, melanoma, and high grade malignant tumors of the CNS. In addition to these intrinsically radioresistant tumor types, the relatively responsive epidermoid cancer, which can readily be eradicated when the tumor is small, becomes radioresistant at later stages of growth. The combined experience of neutron therapy installations throughout the world totals some 6,000 patients treated for a wide variety of late stage malignant tumors; results for patients with particularly radioresistant tumors, in whom good long-term responses have been observed, are summarized. One advantage of the NB unit is the practical feasibility of reduced fractionation in radiotherapy. A 6-wk course of therapy can be reduced to 7 or 13 fractions (1/wk or 2/wk), instead of the 30 fractions required with conventional radiation therapy. (64 Refs)

56. LOCALIZED HYPERTHERMIA IN THE TREATMENT OF CANCER.

Storm FK, Morton DL
Div. Surgical Oncology, Dept. Surgery, UCLA Sch. Medicine, Univ. California, Los Angeles, CA, 90024
Int Adv Surg Oncol; 5:261-275 1982

Thermosensitivity of tumor cells, mechanisms of thermal kill, selective tumor heating, localized hyperthermia techniques, tumor heating capacity, histopathologic and gross morphologic effects of heat, dose/response of thermal therapy, local and systemic toxicity, immune correlatives, and future hyperthermia potential are discussed. Localized hyperthermia techniques are water bath, isolated limb perfusion, low-frequency current fields, ferromagnetic coupling, ultrasound, microwaves, and radio frequency waves. A clinical trail was preformed for patients with advanced cancer who did not respond to standard methods of therapy, including surgery, radiation therapy, chemotherapy, or combination therapy. Of 89 tumors evaluated in skin, sc tissue, muscle, intraabdominal viscera, intrathoracic viscera, or bone, temperatures greater than or equal to 42 C were possible in 69 tumors, greater than or equal to 45 C in 22, and greater than or equal to 50 C in 22, whereas normal tissue remained within a physiologic temperature range of less than 45 C. In 22 of these tumors, the central tumor temperature was compared to that of the normal tissue/tumor interface. In two

no difference was observed, in nine the difference was less than or equal to 1 C, in five the difference was less than or equal to 1.5 C, in three less than or equal to 2.5 C, and in three was 3.5-9 C difference. Reports suggested that potentially effective hyperthermia can be achieved in most superficial and visceral solid human tumors regardless of histopathologic type, although it is most effective for large tumors. Local toxicity depends upon the heat dose and the method of hyperthermia. (58 Refs)

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BREAST NEOPLASMS

1. RADIATION THERAPY PLANNING BASED ON PARASTERNAL LYMPHOSCINTIGRAPHY IN PATIENTS WITH BREAST CANCER.

Ohtake E
Dept. Nuclear Medicine and Radiological Sciences, Tokyo Metropolitan Geriatric Hosp., Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 42(3):288-302 1982

Planning parasternal lymph node radiotherapy was studied in 24 breast cancer patients (women; 26-76 yr old) with autopsy-verified lymph nodes. Simple mastectomy had been performed in 2 of the patients and radical mastectomy in 21. Parasternal lymphoscintigraphy was performed in all of the patients 4 hr after bilateral subcostal injection of 99mTc-sulfur colloid or 99mTc-antimony sulfide colloid. Location of the lymph nodes was observed with the aid of a conventional parallel hole collimator and a bilateral collimator. The width between the right and left parasternal lymph nodes was 5.6 +-1.0 cm (range 4.1-7.7 cm), and the lateral distance from the center of the sternum to the lymph nodes was 2.3 +-0.8 cm (range 0.7-5.2 cm); the lateral distance tended to be wider on the right

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side than on the left. The depth of the lymph nodes from the body surface was 2.3 +-0.7 cm (range 0.9-4.3 cm), and the depth of the lymph nodes increased with respect to the degree of obesity of the person. Retrospective study indicated that 59% of the parasternal lymph nodes were within the radiation field and 19% of the lymph nodes were seated within 1 cm of the intended depth of radiation penetration. This suggested that parasternal lymphoscintigraphy might be performed prior to radiotherapy to determine the location and depth of the parasternal lymph nodes. (56 Refs) (In JPN)

2. UTILIZATION OF PARASTERNAL LYMPHOSCINTIGRAPHY IN RADIATION THERAPY OF BREAST CARCINOMA.

Siddon RL, Chin LM, Zimmerman RE, Mendel JB, Kaplan WD
Joint Center for Radiation Therapy, Harvard Medical Sch., Boston, MA, 02115
Int J Radiat Oncol Biol Phys; 8(6):1059-1063 1982

A new lymphoscintigraphy localization technique which does not depend upon the shape of the sternum, the patients transverse contours, or the entrance of the medial tangential field is described. The technique only indicates if the nodes are included in the treatment field or not. Changing the position of the ipsilateral arm from at the patient's side to above the head (treatment position) can change the positions of the lymph nodes by a few mm. The isocenter should be positioned approx 3 mm above the skin to insure alignment with the simulator. (10 Refs)

3. POSTOPERATIVE RADIATION THERAPY FOR CARCINOMA OF THE BREAST: IMPROVED RESULTS WITH ELECTIVE IRRADIATION OF THE CHEST WALL.

Toonkel LM, Fix I, Jacobson LH, Schneider JJ, Wallach CB
Dept. Radiotherapy, Mount Sinai Medical Center, 4300 Alton Road, Miami Beach, FL, 33140
Int J Radiat Oncol Biol Phys; 8(6):977-982 1982

Differences in patient characteristics and outcome of therapy for patients irradiated postoperatively to either the peripheral lymphatics or the peripheral lymphatics and the chest wall were evaluated in 926 patients with carcinoma of the breast. One hundred seventy-five patients with Stage I disease were treated postoperatively; 119 patients receiving peripheral lymphatic treatment had 5 and 10 yr survival probabilities of 83% and 58%, respectively. Fifty-six patients receiving chest wall and peripheral lymphatic treatment showed survival probabilities of 90% and 74% at 5 and 10 yr. Five and 10 yr survival figures for 217 Stage II patients receiving peripheral lymphatic treatment only were 54% and 36% compared with 71% and 49% for 275 patients treated with peripheral lymphatic plus chest wall irradiation; the difference was statistically significant. For 26 Stage III patients receiving peripheral lymphatic irradiation alone, the 5 and 10 yr survival probabilities were 32% and 15%, significantly less than those observed for 213 patients in the chest wall group (51% and 38%). Similar differences were observed for disease-free survival. A marked enhancement in local control for Stage III patients was seen with the addition of chest wall irradiation: 5 and 10 yr figures remained constant at 61% for the peripheral lymphatic group and 79% for the peripheral lymphatic plus chest wall group. Since microscopic residual disease within the soft tissues of the chest wall can metastasize without necessarily manifesting as regionally recurrent disease, postoperative irradiation of the chest wall is recommended for selected patients after radical surgery for breast cancer. (24 Refs)

4. BREAST CANCER: A 21 YEAR EXPERIENCE WITH CONSERVATIVE SURGERY AND RADIATION.

Clark RM, Wilkinson RH, Mahoney LJ, Reid JG, MacDonald WD
Princess Margaret Hosp., 500 Sherbourne St., Toronto, Ontario M4X 1K9, Canada
Int J Radiat Oncol Biol Phys; 8(6):967-975 1982

Six hundred and eighty patients with breast cancer (pathological Stage I and II) were treated by partial mastectomy and, in some, breast irradiation, and followed for 21 yr. None of the patients had clinical evidence of nodal involvement in the axilla or supraclavicular lesions. The age distribution was typical with 23% patients 65-75 yr old at diagnosis and 24% less than 45 yr old. The overall actuarial survival at 5 yr was 78% and at 10 yr 62%. Relative survivals were 83% and 71%, respectively. In the series, 55/177 deaths (31%) were a result of causes other than breast carcinoma. The commonest cause of death was cardiac disease (30 patients). Patients 35-65 and greater than 70 yr old had the best survival. Among the 154 patients who had no radiation, 57% were pathologically T1 and 14% were T2; corresponding percentages among the 526 patients who had radiation were 43% and 23% respectively. When comparing survival with tumor size, no significant difference in survival by T stage was observed. Patients with pathological T1 tumors, however, had an actuarial survival rate of 83% at 5 yr and 63% at 10 yr. In those patients where only the breast was irradiated the relapse rate was 7.6% at 5 yr. The relapse rate was 12.3% if the breast and any nodal group was irradiated. With no radiation to the breast the relapse rate was 24.4% despite a larger proportion of patients with more favorable disease. By 10 yr the relapse rates rose to 16.3%, 21.5%, and 26.5%, in patients with irradiation to the breast only, the breast plus nodes, and in patients not irradiated, respectively. Relapse in the breast alone was not detrimental to survival if treated appropriately. These findings support conservative management of patients with operable breast cancer. (30 Refs)

5. LOCAL RECURRENCE OF BREAST CARCINOMA AND RADIATION THERAPY: CONSIDERATION OF TREATMENT PORTALS FOR RECURRENT LESIONS.

Matsubara S, Suzuki H, Shibuya H, Okuyama T, Horiuchi J
Dept. Radiology, Tokyo Medical and Dental Univ. Sch. Medicine, Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 42(2):152-159 1982

Effects of radiotherapy for recurrent breast cancer were studied in 13 patients with localized and 23 with widely distributed recurrence or metastasis. The pathohistological types of recurrent tumors included 17 scirrhous carcinomas, 11 papillotubular carcinomas, 6 medullary tubular carcinomas, 1 mucous carcinoma, and 1 lobular carcinoma. Of the 13 patients with localized recurrence or metastasis, 4 had lymph node metastasis, 4 had nodular skin recurrence, 3 had invasive skin recurrence, 1 had sternal metastasis, and 1 had costal metastasis. Of the 23 with widely distributed recurrence or metastasis, 14 had invasive skin recurrence, 7 had nodular skin recurrence, and 2 had lymph node metastasis. Patients were treated with telecobalt or betatron radiotherapy. The 5-yr survival rate of the patients with localized recurrence was 62.9%. The localized tumor control rate was 84.6%. On the other hand, all of the patients with widespread recurrence died within 38 mo. Active recurrent tumor growth was observed more often in the areas of skin that were irradiated than in the areas that were not irradiated. Injection of Evans blue stain in the areas of recurrence indicated that lymphatic flow was altered by mastectomy. Thus, when performing radiotherapy for recurrence and metas-

tasis, the lymphatic flow should be carefully investigated to insure a radiation field sufficiently large to account for the lymphatic flow. (19 Refs) (In JPN)

CENTRAL NERVOUS SYSTEM NEOPLASMS

6. COMPUTED TOMOGRAPHY-DIRECTED STEREOTAXY FOR BIOPSY AND INTERSTITIAL IRRADIATION OF BRAIN TUMORS: TECHNICAL NOTE.

Mackay AR, Gutin PH, Hosobuchi Y, Norman D, Bullard DE, Jacques S
Brain Tumor Res. Center, Dept. Neurological Surgery, Sch. Medicine, Univ. California, San Francisco, CA
Neurosurgery; 11(1,part1):38-42 1982

A localizing system was designed which integrated the Lekell stereotactic frame with a General Electric 8800 computed tomography scanner to improve 125I source placement (28 procedures) or for performance of biopsy (2 procedures) in malignant brain tumors. All selected targets were reached precisely, permitting accurate diagnosis and treatment. (7 Refs)

7. INFRATENTORIAL GLIOBLASTOMA: THE ROLE OF NEURAXIS IRRADIATION.

Kopelson G, Linggood R
Dept. Radiation Oncology, Salem Hosp., 81 Highland Ave., Salem, MA, 01970
Int J Radiat Oncol Biol Phys; 8(6):999-1003 1982

The natural history of infratentorial glioblastoma was studied in 15 patients with biopsy proven infratentorial (8 cerebellum, 2 brainstem, 5 intramedullary spinal cord) glioblastoma to assess the need for routine neuraxis irradiation in such patients. An overall actuarial survival rate of 14% at 5 yr was achieved with prognosis being relatively better for low-grade lesions and for tumors in the cerebellum. Of the eight cerebellar patients, brainstem invasion was present at initial presentation in three. Upper cervical spinal cord involvement by direct extension occurred in one patient at exploration and in another at autopsy. In one patient the initial pathology specimen showed microscopic leptomeningeal invasion. No patient developed clinical subarachnoidal seeding, and three autopsies were negative for subarachnoid spread. The one irradiated brainstem patient died at 10 mo of clinically recurrent tumor confined to the primary site. The other patient had a tumor which initially involved the upper cervical spinal cord by direct extension; death occurred within 1 mo because of uncontrolled regional disease with no evidence of subarachnoid dissemination. No spinal cord patient showed evidence at presentation of spread beyond the primary tumor site, and intracranial subarachnoid spread was not apparent clinically in any patient, although no autopsies were performed. Local tumor recurrences were confined to the prior local irradiation portal. Results suggested that routine craniospinal axis irradiation may not be indicated for most patients with infratentorial glioblastoma. (41 Refs)

8. SUCCESSFUL TREATMENT OF CUSHING'S DISEASE USING YTTRIUM-90 RODS.

White MC, Doyle FH, Mashiter K, Joplin GF
Royal Postgraduate Medical Sch. Hammersmith Hosp., London W12 0HS, England
Br Med J; 285(6337):280-282 1982

Interstitial irradiation using yttrium-90 (90Y) rods implanted by needle into the pituitary gland was used as primary treatment in 16 patients with pituitary dependent Cushing's disease. Clinical and biochemical remission was observed within 3 to 6 mo in 13 and in the remaining 3 after a supplementary implant. There was no perioperative morbidity. Follow-up from the time of definitive operation ranged from 6 to 123 mo (mean 39). No recurrence has been observed. The return of a normal diurnal cortisol rhythm has been observed in 10/12 patients studied after remission. Some form of long-term pituitary hormone replacement therapy was required in only the six patients who had received that largest irradiation dose. Implantation of 90Y is safe and effective treatment for patients with Crushing's disease, comparing favorably with selective trans-sphenoidal pituitary surgery. (Author abstract) (19 Refs)

9. TOLERANCE OF THE CENTRAL NERVOUS SYSTEM TO PHOTON IRRADIATION. ENDOCRINE COMPLICATIONS.

Wigg DR, Murray RM, Koschel K
Radiotherapy Dept., Royal Adelaide Hosp., North Terrace, Adelaide 5000, Australia
Acta Radiol Oncol Radiat Phys Biol; 21(1):49-60 1982

Dose-response isoeffect equations have been determined for hypothalamic pituitary insufficiency following cranial irradiation. Of particular importance is the occurrence of complications at doses substantially less than those commonly used for the treatment of central nervous system tumors. Such complications may be severe and potentially life threatening. These complications occur when a small midline 'target' vol containing the pituitary gland, infundibulum and adjacent inferior hypothalamic structures is irradiated. Direct pituitary irradiation is unlikely to be a factor, at least in some cases. The possible role of incidental hypothalamic irradiation in the control of acromegaly and pituitary dependent Cushing's syndrome is discussed. (Author abstract) (53 Refs)

DIGESTIVE NEOPLASMS

10. RESULTS OF RADICAL RADIOTHERAPY OF SQUAMOUS CELL CARCINOMA OF THE OESOPHAGUS.

Newalahy GA, Read GA, Duncan W, Kerr GR
Dept. Clinical Oncology, Western General Hosp. and Royal Infirmary, Edinburgh, Scotland
Clin Radiol; 33(3):347-352 1982

A retrospective study was undertaken of 444 patients who were referred with squamous cell carcinoma of the esophagus during the period January 1956 to December 1974 and who were treated by radical radiotherapy. The overall crude survival rate at 5 yr was 9.0% which is similar to the results of most series reported from other centers and compares favorably with the results of radical surgery. The crude 5 yr survival rate was 5.7% for males and 11.6% for females, a significant difference (p less than 0.05). Survival is analyzed in terms of sex, site, size and histological grade. Patients (males and females) with the best 5-yr survival rates had tumors no more than 5.0 cm in length (11.9%) or confined to the cervical esophagus (18.9%). Histological grade appeared to have no influence on prognosis. The principal morbidity associated with radical radiotherapy is fibrous stricture formation. This occurred in 43.7% of the patients but was usually effectively managed by bouginage. (Author abstract) (4 Refs)

11. RADIATION THERAPY FOR SMALL BOWEL CARCINOMA: REPORT OF THREE PATIENTS AND REVIEW OF THE LITERATURE.

Kopelson G, Gunderson LL
Dept. Radiation Oncology, Salem Hosp., 81 Highland Ave., Salem, MA, 01970
Int J Radiat Oncol Biol Phys; 8(6):1055-1057 1982

Results of the radiotherapeutic management of three patients with carcinoma of the small intestine are reported and the literature on seven previously reported patients is reviewed. All 10 patients had adenocarcinoma. Local disease status after irradiation was assessed in only two patients and local in-field failure occurred in each after 4,500 and 4,000 rad. The major role of irradiation appeared to be that of postoperative treatment to those patients who have a high risk for failing. (10 Refs)

12. RESULTS OF SURGICAL AND COMPLEX TREATMENT OF COLONIC AND RECTAL CARCINOMAS.

Seifart W, Marx G
Zentralinstitut fur Krebsforschung, AdW der DDR, Lindenberger Weg 80, DDR-1115 Berlin-Buch, E. Germany
Arch Geschwulstforsch; 52(6):489-498 1982

Survival rates (SR) were analyzed among 961 patients who underwent treatment of rectal cancers (RC) or colon cancers (CC). Stage-dependent 5-yr SR for RC and CC were in general approx equal. The 5-yr SR for Duke Stage C RC treated by curative or palliative surgery was lower than that for equivalent CC. Prognosis depended on the rate of local recurrence of tumor (10.1% for CC and 30.7% for RC) after curative surgery. In long-term follow-up, the frequency of distant metastases was approx equal for RC and CC. The 5-yr SR for CC after curative surgery was increased from 43% to 74% by adjuvant chemotherapy with 5-fluorouracil (5-FU). 5-FU was administered intraluminally (30 mg/kg body wt) during surgery and iv postoperatively (100 mg/kg in single doses of 1,000 mg/day). The 5-yr SR for RC following curative surgery was increased from 53% to 80%+ by preoperative radiotherapy (20 Gray). This effect was confirmed by analysis of 10-yr SR, which also indicated that other variations in therapy were less effective. The disease-free interval for CC and RC was not significantly increased by postoperative treatment with lomustine (initial dosage 100 mg/square meter) and ftorafur-capsules (20 mg/kg body wt/day for 14 days). Data indicate that radiotherapy should be admir ered in high-risk cases to prevent local recurrence of RC, a that distant metastases of RC or CC can be prevented by ad vant therapy with lomustine + ftorafur or lomustine in Du Stages B and C. (24 Refs) (In GER)

13. THE ROLE OF PRE-OPERATIVE ADJUVANT THERAPY IN THE MANAGEMENT OF BORDERLINE OPERABILITY RECTAL CANCER.

Wassif SB
Rotterdamsch Radio-Therapeutisch Instituut (RRTI), Groene Hilledijk 301, 3075 EA Rotterdam, The Netherlands
Clin Radiol; 33(3):353-358 1982

One hundred and forty-three patients with potentially operable primary rectal cancer (of stage T2, T3 and T4), were allocated to one of three regimens of therapy, ie surgery only (S), preoperative radiotherapy followed by surgery (R), or preoperative radiotherapy combined with daily intravenous fluorouracil during the first 4 days of irradiation followed by surgery (C). The adjuvant therapy was well tolerated. It had no adverse effects on surgical procedures or morbidity. There was improvement in the resectability rate C greater than R greater than S, and reduction in the incidence of Duke's C category in the surgical specimens C less than R less than S. Five-yr follow-up analysis showed marked differences in the local control rates, and a reduced incidence of liver metastases in Group C. There was no significant difference in survival overall between the three treatment groups, but when patients with T3 and T4 tumors were analyzed separately there was a statistically significant improved 5-yr survival in Group C (p less than 0.01) when compared to Group S, while Group R gave a marginally significant result when compared to Group S (p = 0.05). (Author abstract) (9 Refs)

14. PROPOSALS FOR A PROTOCOL FOR THE TREATMENT OF ANAL CARCINOMA.

D'Errico G, Coucourde F, Gallipoli A
Istituto Nazionale per la Prevenzione, lo Studio e la Cura dei, Tumori Fondazione Senatore Pascale, Napoli, Italy
Minerva Chir; 37(8):729-731 1982

Fifty-seven patients (32 women, 25 men) with anal carcinoma were examined. Thirty of these patients, examined for the first time, are discussed with respect to various treatment plans. Seven patients were treated only with radiotherapy, 4 patients underwent local surgical excision followed by radiotherapy, 15 patients were treated using Miles amputation, and 4 women underwent a posterior pelvioectomy. Of the seven patients treated only with radiotherapy two (28%) remained free from relapse for 5 years following the intervention. (10 Refs) (In ITA)

15. EPIDERMOID CARCINOMA OF THE ANUS WITH SECONDARY LUETIC INFECTION.

Schuman ES, Sullivan ES, Kimbrough RC
2228 N.W. Pettygrove St., Portland, OR, 97210
Am J Proctol Gastroenterol Colon Rectal; 33(7):6-7,20 1982

This patient is presented for two reasons. First, the unusual association of a perianal cancer with syphilis infection within the cancer. Second, for the successful application of radiation therapy. Numerous reports in the past have presented patients with genital syphilis associated with cancers in other portions of the body. What is unusual in this case is the simultaneous cancer and luetic infection occurring in the same location. The Darkfield examination is a relatively easy test to perform and is recommended in patients with perianal lesions who are sexually active. The present day application of high-dose super voltage radiation has more efficacy in this lesion than did the low-dose orthovoltage treatments of yr past. Most reports which have been unfavorable for irradiation have used the latter treatment. The use of this radiation therapy as a preoperative regimen can significantly decrease the extent of resection required in many cases and occasionally, as in this case, can be curative. It may be that radiation therapy alone or in a multimodality regimen is optimum for epidermoid carcinomas of the perianal region and further investigation of this is warranted. (Author abstract) (15 Refs)

GYNECOLOGIC NEOPLASMS

16. POSTOPERATIVE RADIOTHERAPY OF EPITHELIAL OVARIAN CARCINOMAS.

Kogelnik HD, Szepesi T
Universitatsklinik fur Strahlentherapie und Strahlenbiologie, Alser Strasse 4, A-1090 Wien, Austria
Gynaekol Rundsch; 22(2):88-95 1982

The role of postoperative radiotherapy of epithelial carcinomas of the ovary is critically evaluated on the basis of recent findings in the international literature. Many prognostic factors must be considered in evaluation of the results of treatment of ovarian carcinomas, in order to make meaningful comparisons of results. Among these factors are the size of the postoperative residual tumor, histology (cell type, differentiation grade I-III), age, tumor stage (diagnosis, surgical technique, and completeness of the operation), as well as the adequacy of treatment. After the aforementioned are considered, adequate abdominopelvic irradiation using the 'moving strip' technique (in a craniocaudal direction) should be the treatment of choice for Stage I, II, and III tumors after complete resection or with residual tumor of less than 2 cm diameter. Exceptions to this rule are Stages IC and IIC with extensive ascites (administer chemotherapy first) and Stage IA, histologically well-differentiated and without rupture of the capsule (radical surgery alone is sufficient). The prerequisite for improvement in hitherto stagnant therapeutic results is intensive interdisciplinary cooperation. (21 Refs) (In GER)

17. STEREO X RAY PHOTOGRAMMETRY APPLIED FOR PREVENTION OF SIGMOID-COLON DAMAGE CAUSED BY RADIATION FROM INTRAUTERINE SOURCES.

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Dept. Radiotherapy, Rotterdamsch Radio-Therapeutisch Instituut, Groene Hilledijk 301, 3075 EA Rotterdam, The Netherlands
Int J Radiat Oncol Biol Phys; 8(6):1011-1017 1982

Details of the application technique and stereo x-ray photogrammetry (SRM) used to prevent severe sigmoid-colon radiation lesions in the radiation therapy of carcinoma of the uterine cervix are presented. Most late complications at the sigmoid-colon and also at the gut appear 1-2 yr following treatment. Follow-up data of all cervix carcinoma patients treated with intrauterine applications between 1973-1976 were reviewed. None of the patients required surgical intervention for radiation damage. The rate of local failures was studied in patients with Stage I, II, or III carcinoma of the cervix. The local failure did not significantly increase when, according to SRM dosimetry, the treatment was modified to prevent radiation damage. When readings from LiF probes inserted into the recto-sigmoid bowel were compared with direct readings (gamma-meter) and with results of SRM measurements at the barium filled sigmoid-colon, large discrepancies were observed. Observed differences could have been caused by the fact that the thermoluminescence method has been applied as an integrating measurement lasting 3 hr and the position of the probe may be changed during that time; whereas the SRM measurement only refers to the moment at which the films have been exposed. Experience with greater than 200 insertions with LiF elements indicated that rectal probes are not suitable for routine sigmoid-colon dosimetry. (9 Refs)

18. RESULTS OF RADIATION THERAPY FOR VULVAR CARCINOMA.

Pirtoli L, Rottoli ML
Policlinico Careggi, Istituto di Radiologia, viale Morgagni, I-50134 Firenze, Italy
Acta Radiol Oncol Radiat Phys Biol; 21(1):45-48 1982

Radical radiation therapy was given to 19 patients with vulvar squamous cell carcinoma, and as a palliative to 17. Complete regression of the tumor was achieved in 17 patients (47%). The 5-yr survival rate was 8/31 patients (26%) in the overall series and 8/19 patients (42%) in the radically irradiated group. (Author abstract) (12 Refs)

HEAD AND NECK NEOPLASMS

19. MEGAVOLTAGE ELECTRON BEAM THERAPY IN THE TREATMENT OF BASAL AND SQUAMOUS CELL CARCINOMATA OF THE PINNA.

Hunter RD, Pereira DT, Pointon RC
Christie Hosp. and Holt Radium Inst., Manchester, England
Clin Radiol; 33(3):341-345 1982

Kilovoltage x-ray therapy has considerable limitations when trying to obtain good functional results in patients with skin carcinomas arising on the pinna. Megavoltage electron beams with their better quality of radiation and homogeneous dose distribution have been recognized to have theoretical advantages. Forty-three patients with basal and squamous cell carcinomata arising on the pinna were treated radically using a 10 MeV electron beam. The technique and dosage are described and discussed. Primary cancer control with retention of the pinna was achieved in 34 patients. Salvage pinnectomy was performed in four patients for recurrence and one patient for radiation necrosis. Two patients with large primary tumors failed to resolve and died of their disease. The advantages for the patient of the policy of primary radical electron mean therapy are discussed. (Author abstract) (7 Refs)

20. OSTEOSARCOMA OF THE JAW: AN ANALYTICAL STUDY OF 13 CASES.

Okuyama T, Horiuchi J, Shibuya H, Suzuki S, Takeda M
Dept. Radiology, Tokyo Medical and Dental Univ. Sch. Dentistry, Tokyo, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 42(3):281-287 1982

Clinical features and roentgenological findings of 13 patients (7 men, 6 women; 23-59 yr old) with osteosarcoma of the jaw are reported and contrasted with those of other types of osteosarcoma. The tumors were located in the mandible in 11 and maxilla in 2. Compared to patients with other types of osteosarcoma, the patients with osteosarcoma of the jaw were slightly older (av 35.8 yr old) and there was not a predominance of male patients in this series. Initial symptoms of the osteosarcoma included painless swelling or masses in the gums, lip numbness, and odontalgia. Lymph node metastasis was observed in 2/13 patients and lung metastasis was observed in 4/13. Roentgenography showed sclerotic type patterns in three cases, lytic type in six, and mixed type in four. Histologically, seven cases were osteoblastic type osteosarcoma, two were chondroblastic type, and four were fibroblastic type. Treatment consisted of surgery alone in four cases and surgery and radiotherapy in nine. The 1-, 2-, and 10-yr survival rates were 100%, 69%, and 44%, respectively. Localized wide-area resec-

tion of the tumor is the treatment of choice, but in situations where this is not possible, localized control using radiotherapy is adequate. (14 Refs) (In JPN)

21. PERSPECTIVES OF HYPERTHERMIA IN THE TREATMENT OF TUMORS OF THE MAXILLOFACIAL AREA.

Dutreix J, Cosset MJ, Brule JM, Salama M, Damia E
Institut Gustave-Roussy, rue Camille-Desmoulins, F 94800 Villejuif, France
Rev Stomatol Chir Maxillofac; 83(2/3):124-128 1982

Encouraging results were obtained in the treatment of patients with malignant maxillofacial tumors by interstitial or intracavitary hyperthermia used alone or in combination with radiotherapy. Disappearance of tumors in 2-4 wk was observed in 4/6 patients in whom temperatures of 43-45 C were reached by infrared radiation. Diathermy at 27 megahertz, producing a temperature of 39.5 C, was ineffective in three other patients. Hyperthermia induced by high-frequency local currents (0.5-1 megahertz) was partially effective in 6/6 patients. (7 Refs) (In FRE)

22. COMPARISON OF PRE- AND POSTOPERATIVE RADIATION IN THE COMBINED TREATMENT OF CARCINOMA OF MAXILLARY SINUS.

Hu YH, Tu GY, Qi YQ, Xu GS, Wu XL, Cai WM, Qin DX, Yan JH, Gu XZ
Cancer Inst. (Hosp.), Chinese Acad. Medical Sciences, Beijing, People's Republic of China
Int J Radiat Oncol Biol Phys; 8(6):1045-1049 1982

Respective 5-yr survival rates were compared in 50 patients (35 males, 15 females, 30-64 yr old, median age 30-39 yr) with cancer of the maxillary sinus. Two groups were identified: pre-group, treated with preoperative irradiation and post-group, treated with postoperative irradiation. In the pre-group, 23/26 patients (64%) survived for greater than 5 yr. In the post-group, 4/14 (29%) patients were alive after 5 yr. Surgical complications occurred in 29% of the pre-group and in 14% of the post-group. Preoperative radiation is recommended because of the more favorable survival rates. (10 Refs)

23. TREATMENT OF NASOPHARYNGEAL CARCINOMA.

Lynn TC, Huang SC, Tu SM
Dept. Otolaryngology, Taiwan Univ. Hosp., Taipei, Taiwan 100, Republic of China
Excerpta Med Int Congr Ser; 571:408-417 1982

Recent increases in understanding of nasopharyngeal cancer (NPC), and in its diagnosis and treatment by radio- and chemotherapy are discussed. In Study I (1958-1973), 1,605 patients in all four stages of disease, were treated with conventional fractionated Co60 radiation. In Study II involving 1,032 patients in all stages of disease, split-dose radiotherapy (RT) was applied for 4 yr and combined chemotherapy with Endoxan (EN) was used in the last year. The 5-yr actuarial survival rate was 43.5% in Study I and 56.0 in Study II. Survival rates in later stages of disease were poorer because of the increased incidence of local recurrence and distant metastases. Postmortem study of 40 patients who died of NPC showed a high incidence of metastases in liver, lung and bone. Because of the high incidence of distant metastases in NPC, systemic treatment with chemo- and immunotherapy are needed to improve results. For chemotherapy after RT, the modern practice is to use a combination of agents in an intermittent manner: bleomycin, oncovin, methotrexate and EN (BOME schedule). Treatment of 44 patients with recurrence and/or metastases, treated with the BOME schedule between 1977 through 1980, led to improved survival rates compared to 81 patients with recurrence who refused chemotherapy. (32 Refs)

24. RESULTS OF LOW DOSE TELECOBALT IRRADIATION IN CANCERS OF THE OROPHARYNX AND ORAL CAVITY.

Popot B, Pierquin B, Calitchi B, Mazeron J, LeBourgeois J
Service de Radiotherapie, Hopital Henri Mondor, F 94010 Creteil, France
Ann Otolaryngol Chir Cervicofac; 99(3):147-149 1982

A comparative study of conventional fractionated irradiation (CFI) and low dose irradiation (LDI) is presented. CFI was used therapeutically on 30 patients (29 men and 1 woman) with oropharyngeal tumors (25), tumors of the oral cavity (4), and squamous cell carcinomas in multiple locations (1). LDI was used on 28 patients (22 men and 6 women) with similar tumors. Mucosal and skin tolerance were satisfactory with LDI, and 1 yr survival rates were comparable to those with CFI. The best response was obtained with 1.5 Gray/hr. (no Refs) (In FRE)

25. SUPPRESSOR CELL ACTIVITY IN PERIPHERAL BLOOD OF PATIENTS WITH SQUAMOUS CELL CARCINOMA OF THE TONSIL.

Mang W, Hammer C, Landauer I, Gruber F
Ear, Nose, Throat Clinics, Ludwig-Maximillians-Universitat, Munich, W. Germany
Excerpta Med Int Congr Ser; 582:249-253 1982

The suppressive activity of mononuclear cells in 62 patients with squamous cell carcinoma of the tonsil was investigated. Patients were treated with surgery plus irradiation, irradiation alone, or irradiation plus chemotherapy. Two tests were used as indicator systems: the phytohemagglutinin stimulated culture, and the one-way mixed lymphocyte reaction. Suppressor activity (SA) of peripheral blood lymphocytes of healthy controls was approx 20%. SA was similar in patients treated by surgery prior to surgery and increased after surgery. Similar findings were reported after irradiation. However, after chemotherapy, SA fell from approx 40% to approx 10%, reflecting the immunosuppressive activity of the chemotherapy. Total SA of activated and spontaneous suppressor cells fluctuated around normal values. SA was low in patients showing no signs of disease and high in patients with growing tumors. SA was high in patients with inoperable disease, decreased and fluctuated over the next 12 mo, then reached a max at 14 mo. SA in lymph nodes was always higher than that in peripheral blood. Lymph node lymphocytes showed a marked increase in SA when tested in allogenic blast formation, suggesting a direct effect of the tumor on suppressor cell population. No correlation of SA with tumor stage could be found. (no Refs)

26. SURVIVAL RATES IN ADVANCED LARYNGEAL CARCINOMAS AFTER POSTOPERATIVE IRRADIATION. THE SANDWICH TECHNIQUE.

Ganzer U, Meyer-Breiting E, Vosteen KH
Dept. Ear, Nose, and Throat, Univ. Dusseldorf, Moorenstrasse 5, 4000 Dusseldorf, W. Germany
Excerpta Med Int Congr Ser; 582:55-59 1982

Survival of 379 patients with laryngeal or pharyngeal cancer with the sandwich technique [ST: preirradiation with 30 Gray (Gy), laryngectomy, then postirradiation with 30 Gy] or laryngectomy followed by irradiation (60 Gy) was compared. Sixty-

one patients were treated with the ST. Patients were followed for a minimum of 5 yr. Five- and 10-yr survival rates, respectively, were as follows: for supraglottic carcinoma tumor (T)3-4, NO-3, 68% and 60% with the ST and 63% and 53% with postoperative irradiation; for glottic carcinoma T3-4 No-3, 58% and 56% with the ST and 57% and 51% with postoperative irradiation; and for internal laryngeal carcinomas T3-4 NO-3, including the subglottic space, 61% and 55% with the ST and 61% and 54% with postoperative irradiation. Combined irradiation and surgery gave better results than either modality alone in advanced laryngeal carcinoma. In supraglottic carcinoma, the ST gave better results than postoperative irradiation, although the difference was small. The prognosis is worse in patients with preoperatively palpable cervical lymph nodes. (no Refs)

27. TREATMENT AND RESULTS IN A LARYNX CANCER MATERIAL (1945-1980) WITH SPECIAL REFERENCE TO GLOTTIC T1-T2 LESIONS.

Grnastrom M, Hagland S, Lundquist PG
Dept. Oto-Rhino-Laryngology, Karolinska Sjukhuset, Box 60 500, S-104 01 Stockholm, Sweden
Excerpta Med Int Congr Ser; 582:61-64 1982

Treatment and results of 362 patients with laryngeal cancer is reported. Five cancers were subglottic, 52 supraglottic, and 305 glottic. Of the glottic cancers, 198 were tumor (T)1, 97 T2, 56 T3, and 11 T4. Treatment was with irradiation [64 Gray (Gy)] for T1 lesions, irradiation including neck nodes (64 Gy) for T2 lesions, peroperative irradiation (40 Gy) plus laryngectomy for T3 lesions, and preoperative irradiation (40 Gy) plus laryngectomy plus neck dissection for T4 lesions. T1-2 Node 1 lesions were treated with preoperative irradiation (40 Gy) plus laryngectomy plus neck dissection. Recurrences of glottic carcinoma T1 and T2 involved laryngectomy (38 cases), cordectomy (9), hemilaryngectomy (12) and miscellaneous (3). Of the 12 recurrences treated with hemilaryngectomy, 8 patients were alive with no evidence of disease, 1 was alive without tumor although laryngectomy had been performed, and 2 had died of lung cancer with no laryngeal recurrences at 3-5 yr follow-up. The 5-yr survival rate in patients with T1 or T2 recurrences was 91% and for T3-T4 recurrences, 52%. Only three tumors that could have been induced by radiotherapy were found; other etiology was possible. (no Refs)

28. THE MANAGEMENT OF GLOTTIC T3 CARCINOMA.

Stell PM, Dalby JE, Singh SD, Ramadan MF, Bainton R
Dept. Otorhinolaryngology, Univ. Liverpool, Liverpool, England
Clin Otolaryngol; 7(3):175-180 1982

Glottic stage T3 carcinoma can be treated by primary radical surgery, primary radical radiotherapy, radical surgery with preoperative irradiation, or partial surgery. Results of treatment of 89 patients with T3 glottic tumors demonstrated that good results can be achieved with radiotherapy if no palpable lymph nodes are found in the neck. A lesion confined to one vocal cord is a different disease from that in which the supra and/or subglottic compartments are involved. Surgery afforded worse results than radiotherapy, probably because surgery was used only for patients with large tumors. (24 Refs)

29. GLOTTIC CARCINOMA LIMITED TO THE VOCAL CORDS.

Van Den Bogaert W, Ostyn F, Van Der Schueren E
Div. Oncology, Radiotherapy Dept., Academic Hosp. St. Rafael, B-3000 Leuven, Belgium
Acta Radiol Oncol Radiat Phys Biol; 21(1):33-37 1982

Radiation therapy is generally considered to be the best primary treatment for early glottic carcinoma, with surgery reserved for local failure. In a series of 150 cases of T1 glottic carcinoma 138 were given radiation alone. In these patients the survival was 88% at 3 yr and 77% at 5 yr. Local control remained unchanged at 82% after 6 yr. When the results of surgery are included, local control was raised to 93%. Preservation of the larynx was obtained in 92% of survivors. Local extension or radiation dose levels had no influence on local control. The optimum dose could be lower than generally recommended. Voice quality after radiation therapy is superior to postsurgical laryngeal function. Since survival rates are identical, radiation therapy alone is the treatment of choice in all early glottic carcinomas. (Author abstract) (39 Refs)

30. FUNCTIONAL RESULTS AFTER PRIMARY RADIATION THERAPY OF VOCAL CORD CANCER (II. REPORT).

Furst H, Seidner W, Mau S
Regierungskrankenhaus, Scharnhorststr. 37, DDR-1040 Berlin, E. Germany
Radiobiol Radiother (Berl); 23(2):123-126 1982

Twenty-six from a series of 297 patients (av age 65.8 yr) undergoing primary radiotherapy for carcinoma of the vocal cords were evaluated for vocal cord function 6-13 yr after treatment. Patients were chosen on the basis of T1-and T2N0M0 tumors, condition after radiotherapy alone, and freedom from recurrence of tumor. Twelve patients had had Stage T1a tumors, 1 Stage T1b, and 13 Stage T2. Twenty-four patients had undergone telecobalt therapy (tumor dose 70 Gray in individual doses of 2 Gray, 5x/wk alternately from contralateral laryngeal fields). Eighteen patients had a pause in therapy afte 40 Gray; the pause lasted 2 wk for 3 patients and 4 wk for 15 patients. Two patients were treated with rapid electrons (same dosage as telecobalt therapy); one of these had a pause after 40 Gray. Evaluation included history, auditory voice states, laryngoscopic appearance, and microstroboscopic findings. Vocal disturbance was Grade 0 for five patients, 0-I for two, I for seven, II for seven, II-III for one, and III for four. Tiredness was noted by 25% of patients after prolonged or loud speech. Voice pitch was too low in two women and five men and too high in three men. Voice quality was generally better for patients with T1 tumors than for those with T2 tumors. Twelve patient showed no limitation or only moderate unilateral limitation of vocal cord mobility during phonation. Overall results were better than those achieved in 20 patients who underwent cordectomy and subsequent reconstruction of the vocal cords. (11 Refs) (In GER)

31. MANAGEMENT OF POST-CRICOID CARCINOMA.

Stell PM, Ramadan MF, Dalby JE, Hibbert J, Raab GM, Singh SD
Dept. Otorhinolaryngology, Univ. Liverpool, Liverpool, England
Clin Otolaryngol; 7(3):145-152 1982

Results of radiotherapy (RT) and surgery in 141 patients (36 men, 105 women; most were 40-70 yr old) with histologically proven post-cricoid carcinoma are presented. Forty-one patients were not treated; half died within 9 wk of presentation and survival beyond 1 yr was rare. Primary RT of 23 patients

resulted in 5-yr survival of 38%. Approx 25% of the 39 patients treated with RT survived 5 yr. Surgery was by excision followed by flap repair (39 patients) or visceral repair (29). Flap repair resulted in only one hospital death, fewer life-threatening complications, a longer hospital stay (av 12 wk due to the two-stage procedure and the high rate of fistulas), and approx 35% survival at 150 wk. Visceral transposition resulted in higher hospital mortality (8/23 undergoing the primary procedure and 5/6 undergoing the salvage procedure), more life-threatening complications (visceral necrosis, cardiovascular collapse, renal failure, pulmonary embolism, mediastinitis, leakage of abdominal anastomoses), a shorter hospital stay (av 6 wk), and approx 10% survival at 150 wk. Patients without lymph node involvement survived longer than those with involved nodes. Small tumors with no clinical evidence of cervical lymph node involvement should be treated with RT. Only a few patients with unilateral metastases can be cured, and survival greater than 2 yr is not expected for patients with bilateral or fixed metastases. (55 Refs)

32. OPTIONAL FRACTIONATION SCHEDULES BASED ON STAGE IN TREATMENT OF DIFFERENTIATED SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK.

Sugawara T, Tanaka O, Iguchi H, Aihara T
Dept. Radiology, Jichi Medical Sch., Tochigi Prefecture, Japan
Nippon Igaku Hoshasen Gakkai Zasshi; 42(3):271-280 1982

Results of external beam radiotherapy of 80 patients with differentiated squamous cell cancer of the larynx (60 patients), hypopharynx (5), oropharynx (8), oral cavity and lip (2), and external auditory canal (5) were analyzed. According to Stage, 32 patients had Stage T1 tumors, 26 Stage T2, 10 Stage T3, and 12 Stage T4. Radiotherapy was administered alone to 48 patients and radiotherapy was administered after or during laryngomicrosurgery in 32 patients with T1 or T2 glottic cancer (Tlms patients). Fractionation schedules were either 200 rad/day, 5x/wk (Category A; 23 patients), 250 rad/day, 5x/wk (Category B; 24 patients), or 300 rad/2 day, 3x/wk (Category C; 33 patients). Recurrence rates of Category A and B patients in the Tlms subgroup were lower than that for Category C patients. The recurrence rate of Category A patients with Stage T3 or T4 (T3+4) tumors were significantly lower than that of Category B patients. No significant differences in recurrence rate were observed according to Category among the patients with Stage T1 or T2 tumors. Effective radiation dose schedules for the Tlms patients and the Stage T3+4 patients, respectively, consisted of greater than 196 rad/day-dose fractions of radiation administered over a period of up to 42 days and less than 153 rad/day-dose fractions of radiation administered over a period of greater than 60 days. (25 Refs) (In JPN)

33. RADIOTHERAPY OF LYMPH NODE METASTASES IN PATIENTS WITH SQUAMOUS CELL CARCINOMA OF THE HEAD AND NECK REGION.

Bartelink H, Breur K, Hart G
Netherlands Cancer Inst., Plesmanlaan 121, Amsterdam, The Netherlands
Int J Radiat Oncol Biol Phys; 8(6):983-989 1982

In order to obtain guidelines for radiation treatment, prognostic parameters were studied retrospectively in 233 patients (male:female ratio 5:1, median age 65 yr) who received radiation therapy for neck node metastases. The primary tumor of all patients was squamous cell carcinoma of the head and neck. The most frequent sites of the primary tumor were the oropharynx, larynx (mostly supraglottic) and oral cavity. Ninety percent of the 57 recurrences of the neck node metastases occurred during the first yr after irradiation; none occurred in the formerly irradiated area more than 2 yr after irradiation. Severe complications were observed in 16/233 patients (7%); the most important was dysphagia seen in 10 patients, one of whom died of sepsis following malignant cachexia. Of the 137 patients who were electively irradiated on the contralateral neck, 11 patients developed a neck node metastasis on that side during the follow-up period and most (7/11) also had a recurrence of the primary tumor or the homolateral neck node metastases. In 7/31 patients who received a dosage less than 1,100 R, an outgrowth of neck node metastases was observed. The actuarial survival rates at 3 and 5 yr were 25 and 21%, respectively. Prognostic factors related to the survival rate were: Tumor-stage, Nodal-stage, radiation dose, and residual disease 6 wk after irradiation period. (41 Refs)

34. INTRA-ARTERIAL INFUSION CHEMOTHERAPY WITH METHOTREXATE AND ADRIAMYCIN AND RADIOTHERAPY IN PATIENTS WITH CANCER OF THE HEAD AND NECK.

Turriziani A, Trodella L, Ausili Cefaro G, Montemaggi P, Caracciolo F
Dept. Oncological Radiotherapy, U.C.S.C., Rome, Italy
Excerpta Med Int Congr Ser; 575:139-144 1982

The possibility of improving the rate of local response was tested in 37 patients (male:female ratio 75%:25%, av female age 36 yr, av male age 59 yr) with advanced head and neck tumors by adding infusion chemotherapy (methotrexate, MTX; adriamycin, ADM) to the radiotherapeutic regimen. Thirty-three patients had squamous cell carcinoma, 2 cylindroma, and 2 mucoepidermoid adenocarcinoma. Four out of 17 tumors of the tongue were located in the mobile portion, and 13 in the root. MTX, 5 mg/day, was used a single agent in 26 patients, and combined sequentially with 10 mg/day ADM. Each drug was diluted in 500 ml saline and 5,000 units of heparin were added. Infusions lasted for 24 hr/day, av 15 days. The dose of the interstitial radiotherapy was 60-65 Gray units (Gy) to the tumor. External radiotherapy reached a dose of 80 Gy. Patient status was evaluated at the end of chemotherapy and after completion of radiotherapy. After chemotherapy 3 patients (8.3%) failed to respond, 9 (24.9%) had less than 50% reduction in tumor size, 23 (52.1%) greater than 50% response, and 2 (5.4%) a complete clinical remission (100% response). Response to radiotherapy was complete in 17 patients (46.2%), greater than 50% in 11 (29.4%), and less than 50% in 6 (16.2%). Three patients (8.3%) failed to respond. Analysis of survival according to stage revealed that 6/9 patients with Stage II disease lived and were free of disease after an av of 21 mo (range 7-48 mo), while three died after a mean survival of 8 mo. Survival was analyzed according to the presence of the lymph node involvement. All 15 patients with cervical lymph node metastases experienced persistent or recurrent disease, and 14 died after a mean survival of 17 mo. (6 Refs)

35. INDOMETHACIN SENSITIVE SUPPRESSOR CELL ACTIVITY IN HEAD AND NECK CANCER PATIENTS PRE- AND POSTIRRADIATION THERAPY.

Maca RD, Panje WR
(c/o Panje) Dept. Otolaryngology and Maxillofacial Surgery, Univ. Iowa Hosp., Iowa City, IA, 52242
Cancer; 50(3):483-489 1982

The effects of the addition of indomethacin to PHA or Con A stimulated lymphocytes from patients with untreated squa-

mous cell carcinoma of the head and neck or from patients with the disease who have just finished irradiation therapy from the disease was quantitated and compared to those of the control group. Lymphocytes from 8 of 26 patients with untreated carcinoma were significantly augmented by the addition of indomethacin. The remaining 18 patients were equal to the controls. For all 17 patients who had just finished extensive field irradiation therapy, significant enhancement of PHA and Con A reactivity by indomethacin was found, which did not appear to be solely a function of low baseline mitogen reactivity. In additional studies, stimulated lymphocytes of irradiated patients were tested for their sensitivity to the inhibitory effect of PGE2. The mitogen treated lymphocytes from all patients that had just finished irradiation therapy were found to be significantly more sensitive to the inhibition by PGE2 as compared to the normal lymphocyte response. This effect was also found not to be related merely to a low PHA or Con A reactivity of the lymphocytes. In both patient groups there was a striking correlation between the percent augmentation of indomethacin and the percent inhibition of PGE2 in that when the percent augmentation values were low so were percent inhibition values and when the degree of augmentation by indomethacin was elevated so was the inhibition by PGE2. This data suggests that increased sensitivity of stimulated lymphocytes to PGE2 may be responsible, at least in part, for the depressed mitogen response and the significant augmentation of this immune response by indomethacin in about 1/3 of the untreated patients with advanced head and neck carcinoma and in those patients who have just finished irradiation therapy. The results of this study support the hypothesis that perhaps patients receiving irradiation therapy may benefit by the oral administration of indomethacin, an approach that needs further consideration. (Author abstract) (33 Refs)

HEMATOLOGIC, RETICULOENDOTHELIAL AND LYMPHATIC NEOPLASMS

36. TREATMENT OF GENERALIZED HODGKIN'S DISEASE IN CHILDREN.

Vialushkin BIa, Koshel' IV, Tsyplenkov VG
Inst. Pediatrics, Moscow, USSR
Pediatriia; (6):49-52 1982

Results of treatment of 81 children (3-15 yr old) who had generalized Hodgkin's disease (HD) are reported. Twenty-one of these patients were in Stage IIIA, and 60 were in Stage IIIB; 9 had lymphoid predominance, 11 had nodular sclerosis, 49 had mixed variant, and 12 had lymphoid depletion. Prior to chemotherapy, the patients were subjected to exploratory laparotomy with splenectomy, biopsy of enlarged lymph nodes, and marginal liver biopsy. Histological examination showed spleen involvement in greater than 70% of the patients. Induction therapy included administration of cyclophosphamide (600 mg/square meter, iv, days 1 and 8), vinblastine (15 mg/square/meter, iv, days 1 and 8), procarbazine (100 mg/square meter, po, daily), and prednisone (40 mg/square meter, po, daily). The patients received six 2-wk courses of the polychemotherapy with 10-14 days between the courses. Complete remission was achieved in greater than 95% of the patients. Maintenance therapy included distance gamma irradiation (3,500-4,500 rads to the primary focus and 3,200-4,000 rads to zones of regional metastatic spread). The 5-yr survival rate was 92.7%; 54.6% of the patients were free of recurrences. (no Refs) (In RUS)

37. EORTC (EUROPEAN ORGANIZATION FOR RESEARCH ON TREATMENT OF CANCER) STUDY OF HODGKIN'S DISEASE.

Somers R, Burgers JMV, Hartgrink-Groeneveld CA, Kazem I, Noordijk EM, Qasim MM, Sinoo W, Van Unnik JAM, Wagener DJTh
Antoni van Leeuwenhoek Ziekenhuis, Amsterdam, The Netherlands
Ned Tijdschr Geneeskd; 126(14):616-622 1982

The results of two clinical trials in patients with Hodgkin's disease Stage I and II are presented. The first trial during the period 1964-1971, ie, before the introduction of staging laparotomy and polychemotherapy, include 153 patients subjected to radiotherapy and 136 subjected to radiotherapy and to chemotherapy with vinblastine. The incidences of recurrence were 58% in the radiotherapy group and 37% in the combination therapy group (p less than 0.01), and the 5-yr symptom-free survival rates were significantly higher after combination therapy than after radiotherapy only, even though the difference in the overall 5-yr survival rates was not significant. Recurrences developed in the irradiated area in 11% of the patients subjected to radiotherapy only, and in 6% of those subjected to combination therapy. The survival rates were significantly higher (p less than 0.005) in the patients with favorable prognoses than in those with unfavorable prognoses. The second trial during the period 1971-1976 included 131 patients (Group I) subjected to radiotherapy only (mantle-field irradiation) and 125 (Group II) subjected to staging laparotomy with splenectomy, followed by mantle-field irradiation. Splen involvement was found in 37/125 laparotomized patients. The incidences of recurrences were 33% in Group I, 20% in the 88 patients without and 46% in those with spleen involvement in Group II. The symptom-free survival rate was found to be lowest for the patients with spleen involvement. Extended irradiation involving the upper abdomen had favorable effect on both the overall and symptom-free survival rates in the patients with favorable and unfavorable prognostic signs alike compared with the first trial. (10 Refs) (In DUT)

38. PATTERNS OF RELAPSE FOLLOWING RADIOTHERAPY FOR HODGKIN'S DISEASE.

Yarnold JR, Jelliffe AM, Hudson GV
(c/o Jelliffe) Dept. Radiotherapy and Oncology, Middlesex Hosp., London, England
Clin Radiol; 33(2):137-140 1982

A study of the relationship between bulk disease and sites of relapse has been undertaken in 95 patients treated by radiotherapy for early stage Hodgkin's disease. All patients were investigated and treated according to protocols of the British National Lymphoma Investigation. In a group of 80 pathologically staged patients the pattern of relapse in 39 patients confirms an association between recurrence and sites of bulk involvement in the mediastinum, neck and axilla. Bulk disease predisposes to recurrence by virtue of local failure inside the treatment vol as well as marginal recurrence. A small number of patients relapsed initially in sites that were irradiated prophylactically. (Author abstract) (8 Refs)

39. ALLOGENEIC MARROW TRANSPLANTATION FOR ACUTE NON-LYMPHOBLASTIC LEUKEMIA IN RELAPSE USING FRACTIONATED TOTAL BODY IRRADIATION.

Buckner CD, Clift RA, Thomas ED, Sanders JE, Stewart PS, Storb R, Sullivan KM, Hackman R
Fred Hutchinson Cancer Res. Center, 1124 Columbia St., Seattle, WA, 98104
Leuk Res; 6(3):389-394 1982

Twenty-three patients (10-52 yr old) with acute non-lymphoblastic leukemia in relapse were treated with cyclophosphamide (60 mg/kg on days-10 and-9), fractionated total body irradiation (200 rad/day on day-5 and day 0), and allogeneic marrow transplantation. One patient died of infection on day 17 without evidence of engraftment; all other patients achieved engraftment. Eight patients relapsed between 30 and 619 days after transplantation and died of leukemia-related problems. Six of the 23 patients (26%) were alive and free of disease 756-1,306 days following transplantation. Seven of the 22 patients with sustained engraftment developed significant acute graft-vs-host disease (GVHD, Grade 2 or greater). Eight of 15 patients surviving greater than 100 days developed chronic GVHD. Of 11 with sustained engraftment and no significant GVHD, none survived. Sixteen patients had cytogenetic studies of marrow prior to transplantation to detect leukemia-associated chromosomal abnormalities. In 2 patients such abnormalities could not be detected, and a variety of chromosomal rearrangements was present in the 14 other patients. All eight patients who relapsed after transplantation had leukemia-associated chromosomal markers before transplantation, and four of the patients had donors of opposite sex. After relapse, five patients were studied, and in all patients the recurrent leukemia cells were of host type. (23 Refs)

40. ALLOGENEIC MARROW TRANSPLANTATION USING FRACTIONATED TOTAL BODY IRRADIATION IN PATIENTS WITH ACUTE LYMPHOBLASTIC LEUKEMIA IN RELAPSE.

Clift RA, Buckner CD, Thomas ED, Sanders JE, Stewart PS, Sullivan KM, McGuffin R, Hersman J, Sale GE, Storb R
Fred Hutchinson Cancer Res. Center, 1124 Columbia St., Seattle, WA, 98104
Leuk Res; 6(3):401-407 1982

Results of treating 41 patients with acute lymphoblastic leukemia (ALL) in relapse with high dose cyclophosphamide (120 mg.kg) and fractionated total body irradiation (TBI) regimens (1,200-1,750 rad) followed by marrow transplantation from HLA-matched siblings are described. Six fractionated TBI regimens were evaluated. Forty of 41 patients had evidence of engraftment as determined by rising peripheral blood counts and histological examination of marrow. Ten patients died of non-leukemic causes between days 11 and 143 and had no evidence of residual or recurrent leukemia. Eighteen of 41 patients had radiographic evidence of pneumonitis. Clinically, 13/18 patients were thought to be interstitial, 4/18 alveolar, and 1/18 both alveolar and interstitial. Nine patients underwent open-lung biopsy. Ten of the 18 patients with pneumonitis died and the pneumonitis was the primary cause of death in 7 (1 histoplasmosis, 4 cytomegalovirus, 1 Pneumocystis, and 1 Candida). Ten patients died without evidence of leukemia, 9 during the first 66 days and 1 on day 143. One patient died on day 19 of infection but had persistent leukemia at autopsy. Of the 40 patients achieving sustained engraftment, 6 developed significant acute graft-vs-host disease (GVHD; Grade 2-4) and 7 developed chronic GVHD. Twenty-eight patients had neither significant acute or chronic GVHD, and 20/28 patients had leukemic relapse including 4 at extramedullary sites. Fourteen of the 27 patients who relapsed had donors of opposite sex; in 10/14 patients the chromosome marker on the leukemic cells was of host origin, and in 1/14 the origin could not be established. (27 Refs)

41. ALLOGENEIC MARROW TRANSPLANTATION FOR ACUTE LYMPHOBLASTIC LEUKEMIA IN REMISSION USING FRACTIONATED TOTAL BODY IRRADIATION.

Clift RA, Buckner CD, Thomas ED, Sanders JE, Stewart PS, McGuffin R, Hersman J, Sullivan KM, Sale GE, Storb R
Fred Hutchinson Cancer Res. Center, 1124 Columbia St., Seattle, WA, 98104
Leuk Res; 6(3):409-412 1982

Twelve patients (4-29 yr old) with acute lymphoblastic leukemia (ALL) in second to fourth remission were treated with cyclophosphamide (120 mg/kg), 1,400 rad of fractionated total body irradiation, then allogeneic marrow transplantation. All patients were given methotrexate (MTX) 15 mg/square meter (m2) on day 1, 10 mg/m2 on days 3, 6, and 11, and then weekly to day 102 to prevent graft-vs-host disease (GVHD). Alternate MTX doses were given as 12 mg intrathecally from days 32 to 102 to prevent CNS relapse. Two of five patients transplanted in second remission had the initial relapse after maintenance chemotherapy had been discontinued. All patients achieved engraftment. Two patients died on days 32 and 62 of interstitial pneumonitis associated with cytomegalovirus. Six patients relapsed between day 59 and 659, and 4/6 died of leukemia-related problems. Two patients who relapsed were alive, one in relapse, and one in remission following local irradiation for isolated testicular relapse. Four patients were alive and free of disease from 658-992 days following transplantation. Eight patients did not have significant (Grade 2 or greater acute and/or chronic) GVHD: two died on days 32 and 62 of interstitial pneumonitis, five relapsed (1 survived), and one was alive and disease-free 838 days after transplant. All four patients with significant acute or chronic GVHD were alive. Results suggested that 1,400 rad fractionated irradiation is not more effective than 1,000 rad delivered in a single exposure in patients transplanted for ALL in remission or relapse either in terms of survival or of frequency of relapse. (23 Refs)

42. TOTAL BODY IRRADIATION BEFORE BONE MARROW TRANSPLANTATION: A REVIEW.

Barrett A
Inst. Cancer Res., Royal Marsden Hosp., Downs Road, Sutton, Surrey, England
Clin Radiol; 33(2):131-135 1982

An increasing number of centers are undertaking BMT and many different techniques are being evolved for TBI. The critical factors to be considered are total dose and dose rate. Conventional single treatments of 1,000 cGy (rad) at low dose rates are effective and safe, but alternative fractionated regimes are being explored. As few groups treat enough patients to be able to conduct a randomized study, careful and standardized recording of technique and doses given will be important in determining optimum ways of delivering TBI. (Author abstract) (20 Refs)

MUSCULOSKELETAL NEOPLASMS

43. SOFT TISSUE SARCOMAS: THE ROLE OF RADIATION THERAPY.

Suit HD
Dept. Radiation Therapy, Harvard Medical Sch., Massachusetts General Hosp., Boston, MA
Hosp Pract; 17(7):114-120 1982

Treatment of soft tissue sarcomas with preoperative moderate dose irradiation and conservative surgery is reported. Location, origin, incidence, growth, symptoms, and clinical evaluation of patients with soft tissue sarcomas are reviewed. Biopsy is the only way to distinguish benign from malignant tumors. An inappropriate biopsy can preclude appropriate definitive treatment. Small lesions, thought to be benign cysts, lipomas, fibromas, or angiomas are removed by excisional biopsy. Larger lesions or those thought to be malignant should undergo incisional biopsy. Histopathologic grading and staging of soft tissue sarcomas is reviewed. Large tumors suspected of being malignant should receive 5,000-6,000 rad over 5-6 wk at a dose of 200 rad/day, 5 days/wk. The first 5,000 rad should include the tumor and its probable extensions into adjacent tissues; the last 500-1,000 rad should be given to the tumor alone. Conservative resection should be performed 2-3 wk later. A booster dose of 1,000-1,500 rad should be given to the tumor bed intraoperatively. Treatment of 52 patients with this method resulted in 6/42 patients with large tumors experiencing local recurrence and 20/52 with large tumors developing distant metastases. Local control was achieved in all patients with small tumors (less than 5 cm). Delayed wound healing occurred in 7/52 patients. (no Refs)

44. COMBINATION HYPERTHERMIA AND RADIATION THERAPY FOR MALIGNANT MELANOMA.

Kim JH, Hahn EW, Ahmed SA
Dept. Radiation Therapy, Memorial Sloan-Kettering Cancer Center, 1275 York Ave., New York, NY, 10021
Cancer; 50(3):478-482 1982

Since 1975, clinical studies have been carried out to determine whether radiation when combined with localized hyperthermia evokes improved tumor control compared to that achieved with radiation alone. Local tumor hyperthermia was achieved using radiofrequency inductive heating at 27.12 MHz. In bulky lesions (greater than 100 cm3), radiofrequency conductive heating at 13.56 MHz was also used. More than 100 lesions in 38 patients were treated with radiation alone and hyperthermia in combination with radiation. Most lesions were treated either twice a wk or once a wk, depending on radiation dose fractionation scheme used. The overall result of tumor control rate of the combined therapy is superior to radiation therapy alone (75% vs 46%; p less than 0.01). No enhanced normal tissue morbidity was seen following the combined therapy. The detailed analysis of the treatment results shows that the tumor control rate is dependent on dose per fraction, the total dose, and the initial tumor volume. The radiation alone, at high doses per fraction, was effective in controling 80% of the lesions, if the tumor volume was less than 10 cm3, compared to 30% when the tumor volumes were larger. The combination therapy, on the other hand, effected 80% local tumor control regardless of the tumor volume. The importance of good thermal distribution within the tumor volume, selective heating of the tumor tissues and the sequence and time interval between the combined therapy is discussed. (Author abstract) (20 Refs)

RESPIRATORY AND CARDIOVASCULAR NEOPLASMS

45. INTENSIVE COMBINED CHEMOTHERAPY AND RADIOTHERAPY OF SMALL-CELL BRONCHOGENIC CARCINOMA.

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Arch Geschwulstforsch; 52(6):481-487 1982

The relative effectiveness of combined chemotherapy (CCT), with or without radiotherapy (RT), was studied in 117 patients with morphologically confirmed small-cell bronchogenic carcinoma (SCBC) in Stage III or IV. CCT and RT were administered to 82 patients. CCT alone was administered to 35 patients. CCT regimens consisted of cyclophosphamide (CTX: 500 mg/square meter [mg/m2] iv once in 3 wk), methotrexate (MTX: 10 mg/m2 po weekly), and N-nitroso-N-methyl urea (NMU: 400 mg iv in 2 wk) (Group 1); CTX, MTX, and dacarbazine (DTIC: 200 mg iv over 5 days in wk 1, 4, 7, and 10) (Group 2); or adriamycin (ADR: 50 mg/m2 iv over 3 wk), vincristine (VCR: 1 mg iv/wk), and DTIC (Group 3). RT consisted of 1,000 rad/wk, 5 days/wk in wk 4, 5, 6, 8, and 10. In Group 1 partial remission was achieved in 68-72% of patients and complete remission in 22%. The av survival time was 10.8+ mo overall and 24.2+ mo for those in complete remission. In Group 2 partial remission was achieved in 61% and complete remission in 29%. Av survival time was 7.9+ mo overall and 16.2 mo for those in complete remission. In Group 3 partial remission was achieved in 68% and complete remission in 32%. Av survival time was 8.9+ mo overall and 14.2+ mo for those in complete remission. Among 20 patients receiving only CCT, partial remission was achieved in 75% and complete remission in 25%. In a second group of 15 patients receiving CCT, partial remission was achieved in 80% and complete remission in 20%. Observation times for patients receiving only CCT were too short to evaluate long-term survival. (3 Refs) (In GER)

46. COMBINED RADIOTHERAPY AND CHEMOTHERAPY WITH CYCLOPHOSPHAMIDE, ADRIAMYCIN, METHOTREXATE, PROCARBAZINE (CAMP) IN 64 CONSECUTIVE PATIENTS WITH EPIDERMOID BRONCHOGENIC CARCINOMA, LIMITED DISEASE: A PROSPECTIVE STUDY.

Trovo MG, Tirelli U, De Paoli A, Franchin G, Roncadin M, Magri MD, Galligioni E, Veronesi A, Tumolo S, Carbone A, Grigoletto E
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Int J Radiat Oncol Biol Phys; 8(6):1051-1054 1982

Sixty-four consecutive patients (56 males, 8 females, 39-78 yr old, median age 60.5 yr) with epidermoid bronchogenic carcinoma were treated with radiotherapy and chemotherapy (cyclophosphamide, adriamycin, methotrexate, and procarbazine; CAMP). The median number of CAMP cycles was 4.5. Four patients achieved complete remission, 36 partial remission, and 24 did not respond, for an overall response rate of 62%. Median survival for all patients was 12.7 mo. Sites of relapse are presented. Toxicity was acceptable and no therapy-related death occurred. (21 Refs)

47. A METHOD FOR SELECTIVE ENDOBRONCHIAL AND ENDOTRACHEAL IRRADIATION.

Boedker A, Hald A, Kristensen D
Olfert Fischersgade 46-II-3, DK-1311 Copenhagen, Denmark
J Thorac Cardiovasc Surg; 84(1):59-61 1982

A method for selective endobronchial and endotracheal irradiation is described. This method was used to treat a young woman with an unresectable adenoid cystic carcinoma of the trachea involving the main bronchi. The treatment provided good palliation, as indicated by increase of maximal breathing capacity (MBC) and forced expiratory volume in the first second (FEV 1.0). (Author abstract) (13 Refs)

INSTRUMENTATION AND TECHNOLOGY

48. ELECTROGAMMAGRAPHY: A POSSIBILITY TO CONTROL THE FIELD IN RADIATION THERAPY.

Mamontov V, Telycenas A, Atkocius V, Reichel G, Freitag J, Freitag G
Onkologisches Zentralinstitut, Gesundheitsministeriums der Litauischen SSR, Vilnius, USSR
Radiobiol Radiother (Berl); 23(2):113-118 1982

Electrogammagraphy (EGG) was tested as a method for controlling the field in radiotherapy. After tests using formalin-fixed head phantoms, EGG was performed on 59 patients with malignant tumors of the larynx, esophagus, lungs, urinary bladder, colon, or female genital organs. EGG was performed with several different apparatuses. A lead sheet was used between the object and a selenium plate to ensure reproducible exposure times and prevent overexposure of the selenium plate. Positive and negative methods of image development were used. In phantoms and patients boundaries between air and soft tissues and between soft tissues and bone were clearly delineated. EGG of the thorax showed air-filled cavities distinctly and allowed demonstration of a tumor blocking the bronchial lumen. In EGG of the pelvis, positive EGG was better for the depiction of bone and negative EGG was better for the depiction of soft tissues. Paper imaging facilitated planning of radiotherapy. Positive imaging required higher radiation doses than negative imaging. The quality of the image was limited at source-to-object distances less than 75 cm. EGG allowed more precise planning of radiation doses than did conventional methods. Doses of radiotherapy were thus more effective, and radiation exposure of normal tissues was minimized. (5 Refs) (In GER)

49. ANALYTICAL CALCULATION OF BORON-10 DOSAGE IN CELL NUCLEUS FOR NEUTRON CAPTURE THERAPY.

Kobayashi T, Kanda K
Res. Reactor Inst., Kyoto Univ., Kumatori-cho, Sennan-gun, Osaka, 590-04, Japan
Radiat Res; 91(1):77-94 1982

Analytical calculation was used to evaluate the following measures of physical effects in a spherical cell nucleus subjected to heavy particles caused by thermal neutron reactions in tissue: absorbed energy in the cell nucleus (AECN); the number of particles hitting and/or passing through a cell nucleus; the integrated particle track length in a cell nucleus; and absorbed energy distribution in tissue. The AECN was studied from the viewpoint of four types of relations: range vs cell nucleus radius; range vs linear energy transfer (LET); distance between cell nuclei vs range; and distance between cell nuclei vs LET. The boron selective dose ratio (BSDR) is defined, which relates AECN by heavy charged particles in tissue containing 10B to that in normal tissue. It was much influenced by the 10B distribution in the cell, and if the 10B distribution in the cell is known, can be a very useful scale indicating the selective therapeutic effect of neutron capture therapy. The BSDR, which includes both effects of 10B concentration and distribution, can in principle be calculated for cell components other than the nucleus, such as cell membrane, lysosome, or DNA. (15 Refs)

PRE-CLINICAL STUDIES

50. RADIOSENSITIVITY OF NALL HUMAN MELANOMA TRANSPLANTED INTO NUDE MICE: REPAIR, REOXYGENATION AND DOSE FRACTIONATION.

Guichard M, Malaise EP
Laboratoire de Radiobiologie Cellulaire, Institut de Radiobiologie Clinique, 9480 Villejuif, cedex S, France
Int J Radiat Oncol Biol Phys; 8(6):1005-1010 1982

The respective roles of repair and reoxygenation in the response to fractionated irradiation was studied in Nall human melanoma grafted in athymic mice. When two doses of 10 Gray units (Gy) each were administered to a tumor, separated by intervals ranging from 0-24 hr, a significant increase of the fraction of surviving cells was observed. The reoxygenation was determined by delivering two doses of 10 Gy, separated by intervals varying from 15 min-24 hr. The fraction of hypoxic cells was maximal within 1 hr after irradiation and then decreased slowly. After 24 hr, the fraction was only 54% of the initial value, the difference being significant. Tumors were irradiated in daily sessions with seven doses of 2.5 Gy each. A test dose of 17.5 Gy was delivered 24 hr after the last 2.5 Gy dose to tumors growing in air-breathing animals or in animals asphyxiated 10 min prior to the test dose. With fractionated irradiation, the hypoxic cell fraction remained extremely high. When tumors were removed 6 hr after the last irradiation, the fraction of surviving cells was not significantly different from that observed when the tumors were removed immediately after irradiation. Results indicated the importance of hypoxia as a factor in tumor radioresistance. (36 Refs)

51. CRITICAL COMMENTS ON THERMODOSIMETRY AND HYPOTHESES ON THE USE OF COMPUTED TOMOGRAPHY IN ONCOLOGIC ELECTROMAGNETIC HYPERTHERMIA.

Bistolfi F
Servizio di Radioterapia, Ospedali Galliera, 16128 Genoa, Italy
Minerva Med; 73(27):1891-1898 1982

The value of computerized axial tomography (TAC) in thermodosimetry of deep organs and tissues for oncological electromagnetic hyperthermia is discussed. In view to the difficulties encountered in thermodosimetry TAC is of great value in oncological thermodosimetry, because it demonstrates the geometry of tissues and body walls and adjacent tissues, as well as the water content in tissues. (17 Refs) (In ITA)

REVIEWS

52. EXPERIMENTAL RESULTS AND CLINICAL IMPLICATIONS OF THE FOUR R'S IN FRACTIONATED RADIOTHERAPY.

Trott KR
Strahlenbiolgisches Institut der Universitat Munchen, Ingolstadter Landstrasse 1, D-8042 Neuherberg, W. Germany
Radiat Environ Biophys; 20(3):159-170 1982

In relation to fractionated radiotherapy (RT), a review is presented of experimental and clinical data relative to the four R's: repair of sublethal damage, reoxygenation, redistribution of cells through the division cycle, and regeneration. The clinical importance of redistribution has not been proven experimentally. No unequivocal data on the value of reoxygenation in human cancer exists, while results in rodent tumors show much variability. Repair and regeneration are the most important of the four R's in fractionated RT. Experimental and clinical evidence is presented which suggests a differential response between tumor and late responding normal tissues in regard to these two R's. Tumors in general appear to have a smaller capacity for repairing sublethal radiation damage but a higher capacity for repopulation than late responding normal tissues. The differential responses of tumors and critical organs may permit the design of new fractionation schedules based on better data and may suggest, for certain tumor types, fractionation schedules which are markedly different from conventional schedules and which may permit a better chance of cure of cancer. (31 Refs)

53. EXPANDING OPTIONS IN RADIATION ONCOLOGY: NEUTRON BEAM THERAPY.

Cohen L
Neutron Therapy Facility, Fermilab, PO Box 500, Batavia, IL, 60510
J R Soc Med; 75(6):394-398 1982

Twelve years experience with neutron beam therapy in Britain, the USA, Europe and Japan shows that local control is achievable in late-stage epidermoid cancer somewhat more frequently than with conventional radiotherapy. Tumors reputed to be radioresistant (salivary gland, bladder, rectosigmoid, melanoma, bone and soft-tissue sarcomas) have proved to be particularly responsive to neutrons. Pilot studies in brain and pancreatic tumors suggest promising new approaches to management of cancer in these sites. The availability of neutron therapy in the clinical environment opens new prospects for irradiation of 'radioresistant' tumors, permits more conservative cancer surgery, expands the use of elective chemotherapy and provides a wider range of options for cancer patients. (Author abstract) (12 Refs)

54. CURRENT ROLE OF NITROIMIDAZOLE SENSITIZERS AND SULFHYDRYL PROTECTORS IN CLINICAL ONCOLOGY.

Coleman CN, Brown JM
Div. Radiation Therapy, Stanford Univ. Medical Center, Stanford, CA
Appl Radiol; 11(4):31-32,37-38,42-43 1982

The rationale for development of radio- and chemosensitizers and radioprotectors and current clinical applications of these compounds are discussed. The therapeutic effect of radiotherapy (RT) or chemotherapy (CT) generally increases with increasing doses of therapy. The maximum dose is limited by the toxic effects on normal tissues. With the use of these compounds, by increasing the sensitivity of tumor cells, protecting normal cells, or both, the effective dose of therapy can be increased. Misonidazole was the first 2-nitroimidazole to enter clinical trials as a tumor sensitizer. Doses of the drug are limited by neural toxicity, indicated primarily by sensory peripheral neuropathy. In Phase 2 trials the incidence of neuropathy was 27% and was related to total dose rather than the administration schedule. The maximum therapeutic dose of misonidazole is 10.5-12.0 g/square meter. Efforts to reduce toxicity are aimed at producing drugs that are less lipophilic and more hydrophilic. SR-2508 is currently being tested in animals. Desmethylmisonidazole is undergoing Phase 1 clinical trials. Sulfhydryl compounds protect normal tissues from the effects of ionizing radiation by scavenging free radicals created by the radiation. WR-2721 is being tested in Phase 1 trials. Animal studies indicate that this drug protects bone marrow, skin, salivary glands, and the gastrointestinal tract, but not the brain and spinal cord. WR-2721 is apparently also effective against the toxic effects of some CT agents. (37 Refs)

55. INTERACTION OF DRUGS AND RADIATION - PROMISE OR PITFALL?

Berry RJ
Dept. Oncology, Middlesex Hosp. Medical Sch., London, England
Clin Radiol; 33(2):121-129 1982

The interaction of radiation with drugs is reviewed with a brief history of radiotherapy in cancer treatment and cytotoxic chemotherapy and the kinds of interactions that can be expected. Spatial cooperation studies of the adjuvant role of cytotoxic chemotherapy have revealed that such treatment does not positively affect the patient's prognosis in most cancers. The addition of cytotoxic chemotherapy to surgery and radiotherapy for treatment of breast cancer did not affect the proportion of patients relapse-free at 5 yr, although an approx 2-yr delay in the appearance of recurrent disease was observed. In comparison, the addition of selective local treatment to the response obtained to multiple cytotoxic drugs increases the maintenance of tumor local control. In addition, patients treated with a combination of radiation and chemotherapy have, after long-term follow-up developed leukemia and/or other second malignancies. Cytotoxic drugs also affect normal tissues within the volume treated by radiotherapy. Some drugs may be independent in their toxicity, such as hypoxic cell sensitizers. With radioprotectors, any failure in drug penetration results in an intolerable drug over-dose to limiting normal tissues. Hypoxic cell sensitizers selectively improve tumor response to local treatment by radiotherapy, while at the same time they enhance damage to normal tissues. Current chemotherapeutic agents are insufficiently selective between tumor and host, except in special cases, such as leukemia, some lymphomas, and choriocarcinoma. (22 Refs)

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